



COAL MINING AND RECLAMATION PERMIT APPLICATION TO REVISE A PERMIT (ARP)

Issued To: AMERICAN ENERGY CORP
43521 Mayhugh Hill Rd.
Twp Hwy 88
Beallsville, OH 43716

Permit Number: D-425
Application Number: R-425-21

Effective: 08/12/2010

Telephone: (740) 926-9152

ARP Type:
Revise Refuse Disposal Plan

CONDITIONS

CONDITION TYPE	DESCRIPTION
Coal Waste	Prior to disposal of the upper 30 inches of Coal Waste, submit and have issued an ARP addressing the alkaline amendment requirements for the upper 30 inches of coal waste.

The issuance of this ARP means only that the application to conduct a coal mining operation meets the requirements of Chapter 1513 of the Revised Code, and as such DOES NOT RELIEVE the operator of any obligation to meet other federal, state or local requirements.

This ARP is issued in accordance with and subject to the provisions, conditions, and limitations of Chapter 1513 of the Revised Code and Chapters 1501:13-1, 1501:13-3 through 1501:13-14 of the Administrative Code.

The approved water monitoring plan for this ARP is:

Quality: N/A

Quantity: N/A

Note: Any previous condition(s) imposed on this permit, or subsequent adjacent areas, also apply to this ARP unless noted otherwise.

Signature: _____

John F. Hunter *BH*
Chief, Mineral Resources Management

Date: 08/12/2010

OPERATOR

ORIGINAL

American Energy Corporation

Pond 14 Stability Analysis Report

STABILITY ANALYSIS

General:

A stability analysis was performed on Sediment Pond No 14 per regulatory requirements. Pond 14 will be utilized for sediment control. The worst case scenario was considered for the analysis which would be the full depth hydrostatic pressure upon the embankment.

A range and variation of parameters were utilized in order to evaluate the proposed slope. Values shown for the soil parameters are based on typical values for similar soils in the area. The resulting parameters utilized, as listed in the attached printout, are, in the opinion of the undersigned, the most reasonable and conservative of the estimated field conditions of the soils. The parameters utilized are somewhat conservative, but still resulted in a Static Factor of Safety of 1.84

A phreatic surface was assumed through the embankment from the permanent pool water surface to the toe of the proposed slope. In addition, the rock surface was conservatively assumed to be located ten feet below the existing ground surface. In actuality, the rock layer is most likely located nearer the existing surface which would result in a higher factor of safety than that indicated in the attached calculations.

Based on the analyses performed by the undersigned and under the assumed conditions, the proposed slope should maintain long term stability and exceed the required regulatory requirements for stability.

TABLE #1
Stability Analysis Soil Parameters

Soil Boundary	Material	Density (pcf) ¹	Cohesion (psf) ¹	Friction Angle (°) ¹
Soil #1	In-Situ	110	500	30*
Soil #2	Embankment	106	500	28*

(pcf) = pounds per cubic foot
(psf) = pounds per square foot
(°) = degrees

ORIGINAL

Method of Analysis

The stability analysis was performed using the **GSTABLE 7** computer program. The program is capable of analyzing circular and non-circular failure surfaces. The Modified Bishop Method was used to compute factors of safety. The procedure uses an iterative approach to investigate failure surfaces until a critical surface is found.

Only the circular failure surface was considered since it was found to be more critical.

Slope Stability Analysis Results

The output sheets of the **GSTABLE 7** calculations and the stability section used are attached. The static critical failure surface in the analysis had a minimum safety factor of 1.84, which is considered acceptable. Seismic Analysis was also considered in this analysis and resulted in a Factor of Safety equal to 1.51.

Conclusion:

Based on the analyses and the assumed conditions, the proposed embankment slope for Pond 14 should maintain long term stability and exceed the required regulatory requirements for stability.



A circular professional engineer seal for the State of Ohio. The outer ring contains the text "STATE OF OHIO" at the top and "Professional Engineer" at the bottom, separated by two stars. Inside the ring, the word "REGISTERED" is at the top, and the name "MICHAEL S. KEARNS" and license number "#46650" are in the center. Below the seal is a handwritten signature that appears to read "Michael S. Kearns".

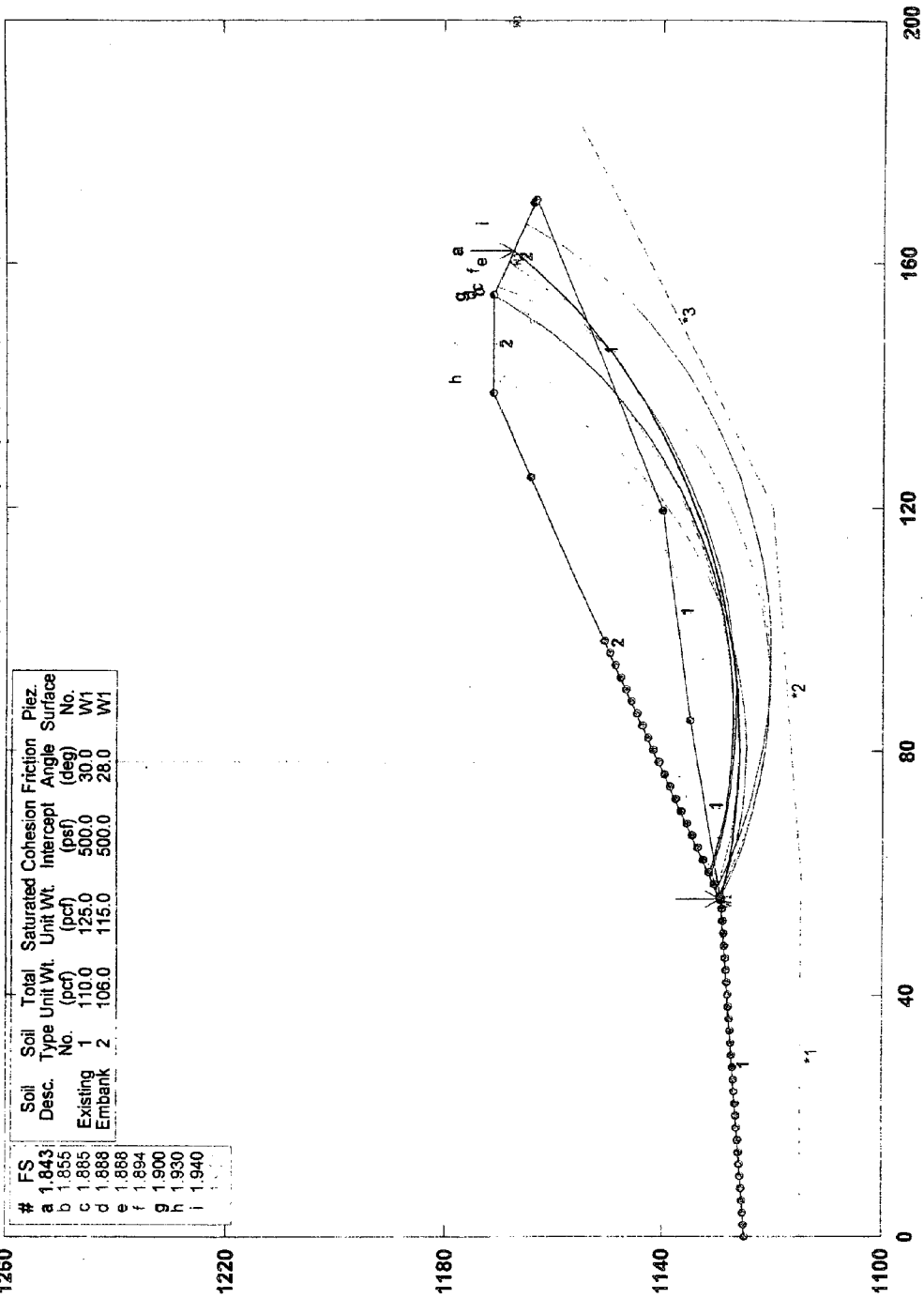
American Energy Corporation

Pond 14 Embankment Stability Analysis

Static Analysis

American Energy Refuse Site Pond 14 Stability Analysis

z:\jobs\client\american energy corp\02001-11\engineering\proposed belline refuse pile\pond 14 stability analysis\pond 14.p2 Run By: Username 1/6/2009 03:25PM



GSTABL7 v.2 FSmin=1.843
Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.005, Sept. 2006 **

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SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.

(Includes Spencer & Morgenstern-Price Type Analysis)

Including Pier/Pile, Reinforcement, Soil Nail, Tieback,

Nonlinear Undrained Shear Strength, Curved Phi Envelope,

Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water

Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

Analysis Run Date: 1/6/2009

Time of Run: 03:25PM

Run By: Username

Input Data Filename: Z:\Jobs\Client\American Energy Corp\02001-11\Engineering\Proposed

Beltline Refuse Pile\Pond 14 Stability Analysis\Pond 14.in

Output Filename: Z:\Jobs\Client\American Energy

Corp\02001-11\Engineering\Proposed Beltline Refuse Pile\Pond 14 Stability Analysis\Pond 14.OUT

Unit System: English

Plotted Output Filename: Z:\Jobs\Client\American Energy Corp\02001-11\Engineering\Proposed
Beltline Refuse Pile\Pond 14 Stability Analysis\Pond 14.PLT

PROBLEM DESCRIPTION: American Energy Refuse Site

Pond 14 Stability Analysis

BOUNDARY COORDINATES

4 Top Boundaries

7 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	1125.00	55.60	1129.39	1
2	55.60	1129.39	138.82	1171.00	2
3	138.82	1171.00	154.82	1171.00	2
4	154.82	1171.00	170.60	1163.11	2
5	55.60	1129.39	85.10	1135.00	1
6	85.10	1135.00	119.43	1140.00	1
7	119.43	1140.00	170.60	1163.11	1

User Specified Y-Origin = 1100.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param. (psf)	Pressure Constant	Piez. Surface No.
1	110.0	125.0	500.0	30.0	0.00	0.0	1
2	106.0	115.0	500.0	28.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED

Unit Weight of Water = 62.40 (pcf)

Piezometric Surface No. 1 Specified by 3 Coordinate Points

Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	55.60	1129.39
2	160.82	1168.00
3	200.00	1168.00

Searching Routine Will Be Limited To An Area Defined By 3 Boundaries

Of Which The First 3 Boundaries Will Deflect Surfaces Upward

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)
1	0.00	1115.00	60.00	1115.00
2	60.00	1115.00	120.00	1120.00
3	120.00	1120.00	183.00	1155.00

Specified Peak Ground Acceleration Coefficient (A) = 0.160(g)

Specified Horizontal Earthquake Coefficient (kh) = 0.080(g)

Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000

EARTHQUAKE DATA HAS BEEN SUPPRESSED

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

500 Trial Surfaces Have Been Generated.

1 Surface(s) Initiate(s) From Each Of 500 Points Equally Spaced Along The Ground Surface Between X = 0.00(ft)

and X = 100.00(ft)

Each Surface Terminates Between X = 125.00(ft)

and X = 170.00(ft)

Unless Further Limitations Were Imposed, The Minimum Elevation

At Which A Surface Extends Is Y = 1100.00(ft)

5.00(ft) Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial

Failure Surfaces Evaluated. They Are

Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Total Number of Trial Surfaces Attempted = 500

Number of Trial Surfaces With Valid FS = 500

Statistical Data On All Valid FS Values:

FS Max = 10.755 FS Min = 1.843 FS Ave = 3.533

Standard Deviation = 1.036 Coefficient of Variation = 29.33 %

Failure Surface Specified By 26 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	55.712	1129.446
2	60.574	1128.281
3	65.489	1127.361
4	70.443	1126.689
5	75.425	1126.266
6	80.422	1126.094
7	85.422	1126.172
8	90.411	1126.502
9	95.377	1127.081
10	100.308	1127.909
11	105.191	1128.983
12	110.015	1130.300
13	114.766	1131.858
14	119.433	1133.652
15	124.004	1135.678
16	128.468	1137.931
17	132.813	1140.405
18	137.028	1143.094
19	141.103	1145.991
20	145.028	1149.089
21	148.792	1152.380
22	152.387	1155.855
23	155.803	1159.507
24	159.031	1163.325
25	162.064	1167.300
26	162.104	1167.358

Circle Center At X = 81.355 ; Y = 1225.721 ; and Radius = 99.632

Factor of Safety

*** 1.843 ***

Individual data on the 33 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force		Tie Force		Earthquake Force		
			Top (lbs)	Bot (lbs)	Norm (lbs)	Tan (lbs)	Hor (lbs)	Ver (lbs)	Surcharge Load (lbs)
1	0.0	0.0	0.0	0.0	0.	0.	0.0	0.0	0.0
2	0.1	0.2	0.0	0.1	0.	0.	0.0	0.0	0.0
3	4.8	1035.7	0.0	428.4	0.	0.	0.0	0.0	0.0
4	4.9	3078.5	0.0	1260.8	0.	0.	0.0	0.0	0.0
5	5.0	5012.6	0.0	2025.9	0.	0.	0.0	0.0	0.0
6	5.0	6815.8	0.0	2721.6	0.	0.	0.0	0.0	0.0
7	5.0	8467.6	0.0	3346.3	0.	0.	0.0	0.0	0.0
8	4.7	9267.8	0.0	3632.0	0.	0.	0.0	0.0	0.0
9	0.3	682.3	0.0	266.3	0.	0.	0.0	0.0	0.0

10	5.0	11242.2	0.0	4376.3	0.	0.	0.0	0.0	0.0
11	5.0	12333.1	0.0	4779.0	0.	0.	0.0	0.0	0.0
12	4.9	13218.3	0.0	5105.5	0.	0.	0.0	0.0	0.0
13	4.9	13891.8	0.0	5354.9	0.	0.	0.0	0.0	0.0
14	4.8	14350.7	0.0	5526.7	0.	0.	0.0	0.0	0.0
15	4.8	14595.0	0.0	5620.2	0.	0.	0.0	0.0	0.0
16	4.7	14619.2	0.0	5632.1	0.	0.	0.0	0.0	0.0
17	0.0	8.7	0.0	3.3	0.	0.	0.0	0.0	0.0
18	4.6	14488.0	0.0	5572.3	0.	0.	0.0	0.0	0.0
19	4.5	14181.4	0.0	5430.8	0.	0.	0.0	0.0	0.0
20	4.3	13686.3	0.0	5211.5	0.	0.	0.0	0.0	0.0
21	4.2	13017.7	0.0	4914.9	0.	0.	0.0	0.0	0.0
22	1.8	5418.2	0.0	2047.8	0.	0.	0.0	0.0	0.0
23	2.3	6635.8	0.0	2493.9	0.	0.	0.0	0.0	0.0
24	3.9	10346.4	0.0	4092.7	0.	0.	0.0	0.0	0.0
25	3.8	8537.3	0.0	3569.3	0.	0.	0.0	0.0	0.0
26	1.7	3388.5	0.0	1493.4	0.	0.	0.0	0.0	0.0
27	1.9	3360.0	0.0	1479.2	0.	0.	0.0	0.0	0.0
28	2.4	3739.1	0.0	1713.3	0.	0.	0.0	0.0	0.0
29	1.0	1284.8	0.0	590.9	0.	0.	0.0	0.0	0.0
30	3.2	2981.2	0.0	1565.9	0.	0.	0.0	0.0	0.0
31	1.8	797.1	0.0	549.6	0.	0.	0.0	0.0	0.0
32	1.2	172.2	27.0	193.9	0.	0.	0.0	0.0	0.0
33	0.0	0.2	1.8	3.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 25 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	57.114	1130.147
2	61.911	1128.735
3	66.785	1127.621
4	71.718	1126.807
5	76.692	1126.298
6	81.688	1126.096
7	86.687	1126.200
8	91.670	1126.612
9	96.619	1127.328
10	101.514	1128.348
11	106.337	1129.665
12	111.070	1131.277
13	115.695	1133.176
14	120.195	1135.355
15	124.553	1137.807
16	128.752	1140.522
17	132.776	1143.489
18	136.611	1146.698
19	140.241	1150.136
20	143.654	1153.791
21	146.835	1157.648
22	149.774	1161.693
23	152.458	1165.911
24	154.879	1170.286
25	155.142	1170.839

Circle Center At X = 82.485 ; Y = 1207.483 ; and Radius = 81.391

Factor of Safety
*** 1.855 ***

Failure Surface Specified By 26 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	55.912	1129.546
2	60.355	1127.254
3	64.953	1125.289
4	69.682	1123.663
5	74.515	1122.384
6	79.429	1121.459
7	84.397	1120.892
8	89.392	1120.687
9	94.390	1120.844

10	99.363	1121.363
11	104.285	1122.241
12	109.131	1123.474
13	113.875	1125.054
14	118.491	1126.974
15	122.956	1129.224
16	127.247	1131.792
17	131.340	1134.663
18	135.214	1137.824
19	138.849	1141.257
20	142.226	1144.945
21	145.326	1148.867
22	148.134	1153.004
23	150.635	1157.334
24	152.816	1161.833
25	154.664	1166.479
26	155.920	1170.450

Circle Center At X = 89.721 ; Y = 1189.594 ; and Radius = 68.912

Factor of Safety
*** 1.885 ***

Failure Surface Specified By 24 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	59.118	1131.149
2	63.909	1129.718
3	68.781	1128.593
4	73.714	1127.778
5	78.689	1127.277
6	83.685	1127.092
7	88.684	1127.223
8	93.664	1127.670
9	98.605	1128.431
10	103.489	1129.503
11	108.295	1130.882
12	113.004	1132.563
13	117.598	1134.537
14	122.057	1136.799
15	126.365	1139.338
16	130.503	1142.144
17	134.455	1145.206
18	138.206	1148.513
19	141.740	1152.050
20	145.043	1155.803
21	148.103	1159.758
22	150.906	1163.899
23	153.441	1168.208
24	154.847	1170.986

Circle Center At X = 84.116 ; Y = 1206.016 ; and Radius = 78.930

Factor of Safety
*** 1.888 ***

Failure Surface Specified By 25 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	59.519	1131.350
2	64.286	1129.839
3	69.133	1128.614
4	74.044	1127.677
5	79.003	1127.032
6	83.990	1126.682
7	88.990	1126.628
8	93.984	1126.870
9	98.955	1127.407
10	103.886	1128.237
11	108.759	1129.358
12	113.557	1130.765
13	118.263	1132.453
14	122.861	1134.417

15	127.335	1136.649
16	131.669	1139.143
17	135.848	1141.888
18	139.857	1144.876
19	143.682	1148.096
20	147.310	1151.536
21	150.728	1155.186
22	153.924	1159.031
23	156.887	1163.058
24	159.607	1167.254
25	160.204	1168.308

Circle Center At X = 87.404 ; Y = 1211.072 ; and Radius = 84.458

Factor of Safety
*** 1.888 ***

Failure Surface Specified By 27 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	56.313	1129.746
2	60.737	1127.418
3	65.315	1125.407
4	70.024	1123.725
5	74.839	1122.380
6	79.738	1121.377
7	84.695	1120.723
8	89.686	1120.421
9	94.686	1120.472
10	99.669	1120.875
11	104.612	1121.629
12	109.489	1122.731
13	114.277	1124.174
14	118.950	1125.951
15	123.486	1128.053
16	127.863	1130.471
17	132.058	1133.192
18	136.051	1136.202
19	139.821	1139.486
20	143.349	1143.028
21	146.619	1146.811
22	149.614	1150.815
23	152.319	1155.020
24	154.720	1159.406
25	156.805	1163.950
26	158.564	1168.630
27	158.693	1169.063

Circle Center At X = 91.469 ; Y = 1191.183 ; and Radius = 70.784

Factor of Safety
*** 1.894 ***

Failure Surface Specified By 24 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	59.920	1131.550
2	64.683	1130.030
3	69.536	1128.826
4	74.457	1127.942
5	79.426	1127.382
6	84.421	1127.150
7	89.420	1127.244
8	94.402	1127.666
9	99.346	1128.414
10	104.230	1129.483
11	109.034	1130.871
12	113.736	1132.570
13	118.317	1134.573
14	122.757	1136.872
15	127.037	1139.458
16	131.138	1142.317
17	135.044	1145.440

18	138.736	1148.811
19	142.199	1152.418
20	145.419	1156.243
21	148.381	1160.271
22	151.073	1164.484
23	153.484	1168.865
24	154.482	1171.000

Circle Center At X = 85.477 ; Y = 1203.348 ; and Radius = 76.211

Factor of Safety
*** 1.900 ***

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	56.112	1129.646
2	60.803	1127.916
3	65.617	1126.563
4	70.522	1125.595
5	75.489	1125.019
6	80.486	1124.839
7	85.481	1125.055
8	90.444	1125.666
9	95.342	1126.668
10	100.146	1128.055
11	104.825	1129.819
12	109.349	1131.947
13	113.690	1134.427
14	117.822	1137.244
15	121.717	1140.379
16	125.351	1143.813
17	128.702	1147.523
18	131.749	1151.488
19	134.472	1155.682
20	136.854	1160.078
21	138.880	1164.649
22	140.538	1169.366
23	140.970	1171.000

Circle Center At X = 80.262 ; Y = 1187.898 ; and Radius = 63.060

Factor of Safety
*** 1.930 ***

Failure Surface Specified By 27 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	57.315	1130.247
2	61.765	1127.968
3	66.351	1125.975
4	71.054	1124.277
5	75.855	1122.881
6	80.735	1121.792
7	85.674	1121.014
8	90.652	1120.551
9	95.650	1120.405
10	100.647	1120.576
11	105.623	1121.063
12	110.559	1121.865
13	115.433	1122.978
14	120.227	1124.397
15	124.922	1126.118
16	129.498	1128.134
17	133.937	1130.435
18	138.221	1133.013
19	142.333	1135.857
20	146.257	1138.956
21	149.976	1142.298
22	153.476	1145.869
23	156.742	1149.655
24	159.762	1153.640
25	162.523	1157.808

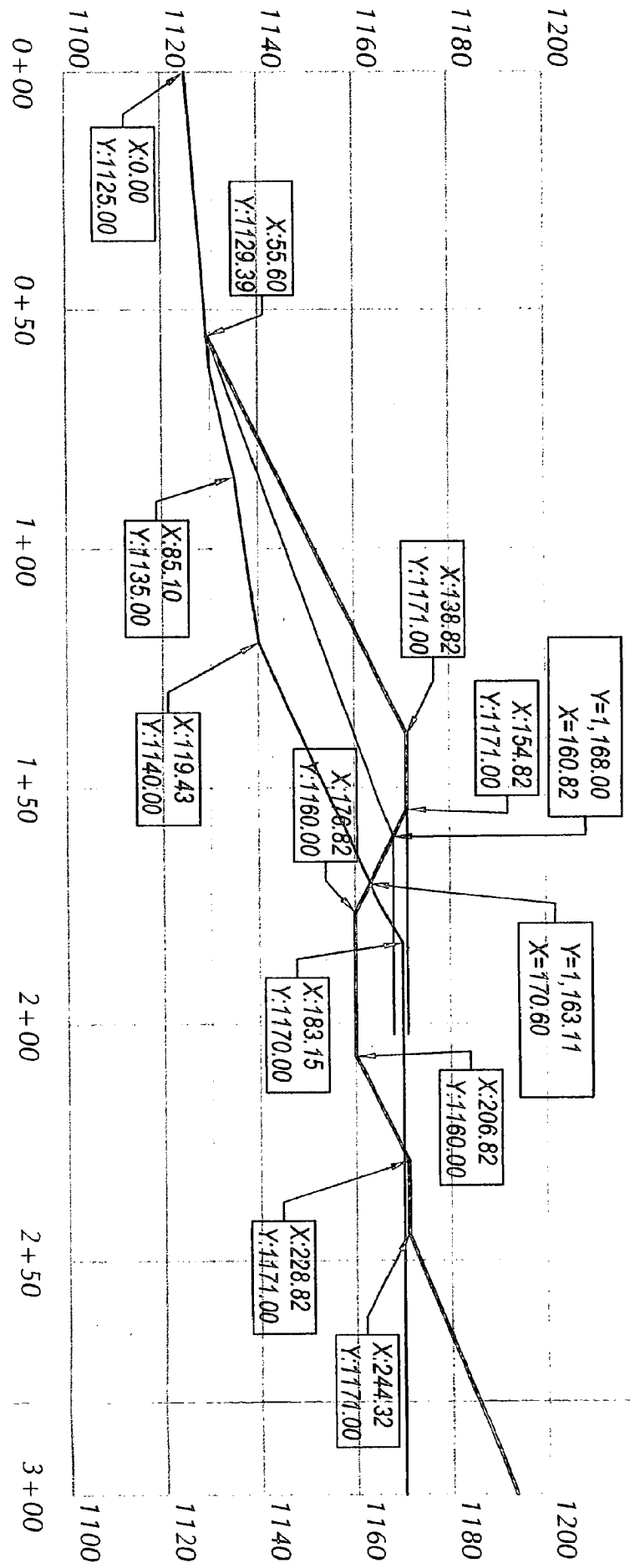
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26      165.014      1162.143
27      166.501      1165.159
Circle Center At X = 95.457 ; Y = 1199.231 ; and Radius = 78.827
Factor of Safety
*** 1.940 ***
Failure Surface Specified By 22 Coordinate Points
Point   X-Surf   Y-Surf
No.      (ft)      (ft)
1        58.517    1130.849
2        63.472    1130.182
3        68.458    1129.799
4        73.457    1129.701
5        78.453    1129.888
6        83.431    1130.360
7        88.374    1131.114
8        93.265    1132.149
9        98.090    1133.462
10       102.832    1135.047
11       107.476    1136.900
12       112.007    1139.015
13       116.410    1141.385
14       120.670    1144.001
15       124.775    1146.857
16       128.710    1149.942
17       132.462    1153.246
18       136.020    1156.759
19       139.373    1160.469
20       142.508    1164.363
21       145.416    1168.431
22       147.040    1171.000
Circle Center At X = 72.690 ; Y = 1217.262 ; and Radius = 87.567
Factor of Safety
*** 1.991 ***
**** END OF GSTABL7 OUTPUT ****

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02001-11
AUG 11 2010
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02001-11

SCALE 1" = 30'
0 30 60 90



OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINERAL RESOURCES MANAGEMENT

APPLICATION TO REVISE A COAL MINING PERMIT

Note: Refer to the division's "General Guidelines for Processing ARPs" and "Requirements for Specific Types of Common ARPs" for guidance on submitting and processing ARPs.

1. Applicant's Name **American Energy Corporation**
Address **43521 Mayhugh Hill Road**
City **Beallsville** State **Ohio** Zip **43716**
Telephone Number **740-926-9152**
2. Permit Number **D-0425-2**
3. Section of mining and reclamation to be revised:
Part 3: A(1), A(5)(a), A(11)(a), D(14), E(1)(2) & (4), F, H(3), H(4), and J(2)
4. Describe in detail the proposed revision and submit any necessary drawings, plans, maps, etc:
This proposed revision is to raise the elevation, revise the footprint of the refuse pile, and revise Pond 014. See attached Addenda.
5. Describe in detail the reason for requesting the revision:
To provide a higher volume of capacity for refuse disposal.
6. Will this revision constitute a significant alteration from the mining and reclamation operations contemplated in the original permit? ☒ Yes, ☐ No.
(Note: refer to paragraph (E)(2) of 1501:13-04-06 of the Ohio Administrative Code to determine if a revision is deemed significant.)

If "yes," complete the following items 7 through 9.
7. In the space below, give the name and address of the newspaper in which the public notice is to be published.

The Times Leader
200 South 4th Street
Martins Ferry, Ohio 43935

OPERATOR

JUL 30 2010

8. In the space below, give the text of the public notice that is to be published. (Include the information required by paragraph (A)(1) of 1501:13-05-01 of the Ohio Administrative Code.)

See Addendum to Application to Revise a Coal Mining Permit Item 8, Public Notice

9. In the space below, give the name and address of the public office where this application is to be filed for public viewing.

Belmont County Courthouse
Recorder's Office
101 West Main Street
St. Clairsville, Ohio 43950

I, the undersigned, a responsible official of the applicant, do hereby verify the information contained in this revision request is true and correct to the best of my information and belief.

Print Name James R. Turner, Jr. Title Treasurer

Signature [Signature] Date 2/20/09

Sworn before me and subscribed in my presence this 20th day of February, 2009



Jean M. Snyder
Notary Public, State of Ohio
My Commission Expires 3/27/12

[Signature]
Notary Public

(For Division Use Only)

This application to revise a mining permit is hereby ☒ issued, ☐ disapproved.

[Signature]
Chief, Division of Mineral Resources Management

AUG 12 2010
Date

OPERATOR

**American Energy Corporation
Addendum to Application to Revise a Coal Mining Permit
Item 8., Public Notice**

PUBLIC NOTICE

American Energy Corporation, 43521 Mayhugh Hill Road, Beallsville, Ohio 43716, has submitted an Application to Revise a Coal Mining Permit #R-425-21 to the Ohio Department of Natural Resources, Division of Mineral Resources Management. The permit area is located in Sections 3 and 4, Wayne Township T-6 R-5, Belmont County, Ohio. The permit area encompasses 107.7 acres and is located on the Hunter 7 ½ minute USGS quadrangle map, approximately 2.4 miles northeast of New Castle, Ohio; south of Captina Creek along Township Road #74. The application proposes to increase the storage volume of the existing coarse coal refuse permit.

The application is on file for public viewing at the Belmont County Courthouse, Recorder's Office, 101 West Main Street, St. Clairsville, Ohio 43950 and shall remain so for at least thirty (30) days following the last date of publication of this notice. Written comments or requests for an informal conference may be filed with the Division of Mineral Resources Management, 2045 Morse Road, Building H-3, Columbus, Ohio 43229-6693, within thirty (30) days after the last date of publication of this notice.

PROOF OF PUBLICATION

Addendum to ARP, Item 8., American Energy Corp.

The State of Ohio
County of Belmont, ss:

The undersigned, being sworn, says that he or she is an employee of Eastern Ohio Newspapers, Inc., A Corporation, publisher of the Times Leader a newspaper published in Martins Ferry, Belmont County, Ohio, each day of the week and of general circulation in said city and county; that it is a newspaper meeting the requirements of sections 7.12 and 5721.01 Ohio Revised Code as amended effective September 24, 1957; that affiant has custody of the records and files of said newspaper; and that the advertisement of which the annexed is a true copy, was published in said newspaper on each of the days in the month and year stated, as follows:

March 3, 10, 17, 24

2009

Candace S. Criswell

Subscribed by Affiant and sworn to before me, this 24th day of March, A.D. 2009.

Rebecca L. Anderson
Notary Public



REBECCA L. ANDERSON
Notary Public, State of Ohio
My Commission Expires Nov. 25, 2011

Printer's Fee \$ 296.16

Notary's Fee \$ _____

The Times Leader
Martins Ferry, Ohio

PUBLIC NOTICE

American Energy Corporation, 43521 Mayhugh Hill Road, Basileville, Ohio 43716, has submitted an Application to Revise a Coal Mining Permit, #R-425-21, to the Ohio Department of Natural Resources, Division of Mineral Resources Management. The permit area is located in Sections 3 and 4, Wayne Township, T-6 R-5, Belmont County, Ohio. The permit area encompasses 107.7 acres and is located on the Hunter 7 1/2 minute USGS quadrangle, approximately 2.4 miles northeast of New Castle, Ohio, south of Caplina Creek along Township Road #74. The application proposes to increase the storage volume of the existing coarse coal refuse permit.

The application is on file for public viewing at the Belmont County Courthouse, Recorder's Office, 101 West Main Street, St. Clairsville, Ohio 43950 and shall remain so for at least thirty (30) days following the last date of publication of this notice. Written comments or requests for an informal conference may be filed with the Division of Mineral Resources Management, 2045 Morse Road, Building H-3, Columbus, Ohio 43229-6693, within thirty (30) days after the last date of publication of this notice.

Pl. Adv. - 3 Tues. - Mar. 3, 10, 17, 24

AUG 11 2010

DEPT. OF NATURAL RESOURCES

MINERAL RESOURCES

AEC 09165

Applicant's Name: **American Energy Corporation**

Name of Mine: Century Mine

Address: 43521 Mayhugh Hill Road, Beallsville, OH 43716

Phone: 740-926-9152

John F. Husted, Chief
Ohio Department of Natural Resources
Division of Mineral Resources Management
2045 Morse Road, Building H-3
Columbus, Ohio 43229-6693

RE: Request for Stream Buffer Zone Variance

Dear Mr. Husted:

We are requesting permission to affect land within the buffer zone of streams "A", "S", "Y", I-13, I-14, and I-15 that are proposed to be affected by refuse disposal operations when mining and reclaiming the proposed permit area, located in Section(s) 3 of Wayne Township, Belmont County.

The applicant has given special consideration regarding the proposed activities to minimize the impact that mining has on each stream and buffer zone. The applicant has determined that the proposed activities would allow mining and reclamation of the proposed permit area while minimizing the impact to each stream.

Therefore, it is our belief that the proposed affectment within these buffer zones will not cause or contribute to the violation of applicable state or federal water quality standards, and will not adversely affect the water quantity and quality or other environmental resources of the stream and request acceptance of the submitted Stream Buffer Zone Variance Request(s).

Sincerely,

Ellen M. Green

FOR DIVISION USE ONLY

This request for stream buffer zone variance is:

☒ Approved ☐ Disapproved

John F. Husted

AUG 12 2010

John F. Husted, Chief
Division of Mineral Resources Management

OPERATOR

05/08
DNR-744-xxxx

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINERAL RESOURCES MANAGEMENT

STREAM BUFFER ZONE VARIANCE REQUEST

Applicant's Name **American Energy Corporation**

Name of Mine: Century Mine

Stream Identification: **Stream "A"**

Type: ☒ Intermittent ☐ Perennial

ENVIRONMENTAL CONDITIONS:

1. Provide a description of the stream's pre-mining water quality/quantity.

Water quality in Stream "A" is good. Water analysis conducted quarterly at D-8A shows all parameters within effluent limitations. Within the past two years, flow rates have ranged between 0.8 to 7.5 cfs.

2. Provide a description of the existing environmental conditions, including riparian vegetation and physical habitat conditions. (*Habitat conditions such as headwater streams, meanders, pools, unique habitat/vegetation must be described even if stream channel is not to be affected.*)

The remaining open stream channel consists of substrates of boulder and bedrock originating from shale, with heavy silt and extensive embeddedness. Instream cover is sparse, consisting of undercut banks, overhanging vegetation, shallows and boulders. There is no riparian width, and the floodplain consists of forest, swamp, and mining/construction, with moderate bank erosion. Maximum depth is <0.2 meters. Pool width is greater than riffle width with slow, intermittent and interstitial velocities. Channel morphology was indicated by moderate to low sinuosity, good to fair development, no channelization recovery and high stability. Modification such as snagging, relocation and bank shaping have occurred. Riparian vegetation consists of Salix interior, Carex squarrosa, Carex granularis, and typha angustifolia.

3. Describe factors influencing existing stream conditions, such as previous mining, commercial or agricultural development, recent logging activity, etc.

Previous pond construction (Pond 016, has been removed) associated with the refuse disposal activities, eliminated Stream "A" down to approximate station 8+43.

4. Identify measures to protect, restore and/or reclaim water and other environmental resources. (*Include sequencing of restoration activities, engineering designs/plans, erosion control measures and restoration of habitat qualities.*)

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Mitigation of stream and wetland impacts associated with the existing refuse disposal area have been completed through stream preservation and stream riparian enhancements along Long Run and Piney Creek, and creation of a wetland. The completed mitigation included impacts to the remaining portion of Stream "A" when refuse disposal from the Century Mine began in December, 2002.

5. Has a 401/404 permit application been submitted? ☐ Yes ☒ No If "no," please provide an explanation of why a permit is not required pursuant to the Clean Water Act, Sections 401/404.

The 401 Water Quality Certification issued on September 13, 2002, and 404 issued November 29, 2002 covers all activities and stream length proposed to be impacted via this A.R.P. Also refer to response to 'Buffer Zone Activities', items 1. & 4., and Buffer Zone Activities, item 1. Wetlands previously existed within the portion of Stream "A" that has been eliminated by refuse disposal and/or pond construction. See attached 401 Certification and 404 Permit copies.

6. If wetlands exist within the buffer zone, provide a description of mitigation of the wetland area.

3.18 Ac. mitigative wetland construction was completed in the spring of 2008 in two separate areas along Long Run.

BUFFER ZONE DISTURBANCE JUSTIFICATION

1. Briefly describe the reasons planned activities in each buffer zone are needed.

Additional space for refuse disposal is critical to the continued mining operation.

2. What other less intrusive measures were considered prior to requesting a variance? Include options that were considered to prevent, minimize or mitigate adverse impacts to the buffer zone.

Less intrusive measures have been considered in the design of the additional vertical and horizontal refuse disposal proposed. Where ever possible, disposal limits have been kept within the current limits of the existing refuse disposal area.

BUFFER ZONE ACTIVITIES

1. Describe each proposed activity that will impact the buffer zone, including specific locations (using linear stream measurements). Identify any areas of the stream channel or buffer zone that will be avoided.

The area to be eliminated by additional refuse disposal is proposed to occur between stations 8+43 and 7+00. Direct stream channel impact in Stream A will be avoided between approximate stations 7+00 and 1+86, however, this portion of the stream will be utilized for sediment transportation to existing Pond 012. Although refuse disposal within Stream "A" downstream of station 7+00 was

previously included in A.A. D-0425-2, current proposed refuse limits are being addressed in this application revision request. Permit D-0425-2 proposed refuse disposal within the Stream "A" channel south to approximate station 6+40. However, refuse disposal under D-0425-2 extended south only to approximate station 13+10. All of this considered, 60 feet less of the Stream "A" channel is proposed to be impacted by the plan proposed in this ARP, then was proposed to be impacted under D-0425-2 (7+00 - 6+40 = 60'). Also refer to the response to 'Environmental Conditions', item 5. of this document.

Construction of diversion ditches DD-003 and DD-006 will occur within the buffer zone of Stream "A" between stations 7+05 and 8+20, and 6+81 and 7+80 respectively. Approximately 150' of ditch DD-003, and approximately 135' of ditch DD-006 is within the buffer zone of Stream "A". Construction of the diversion ditches will not disturb the stream channel. Buffer zone impacts proposed under D-0425-2 were proposed south to approximate station 5+42. Buffer zone impacts proposed in this ARP are proposed south to approximate station 6+81. Therefore, 139 feet less buffer zone impact is proposed when compared to D-0425-2 (6+81 - 5+42 = 139'). Approximately 495' of the buffer zone of Stream "A" (sta. 1+86 to sta. 6+81) will be avoided.

2. Describe the duration (in relative timing and/or sequencing) that each activity will be occurring within the buffer zone.

Diversion ditches DD-003 and DD-006 will take approximately one week to construct. They will both be constructed prior to additional refuse disposal placement, and will remain in place until all refuse disposal activities and associated reclamation of the disposal area is completed. Removal, grading and seeding of the ditches will be done in a timely manner in the first appropriate season after successful vegetation has been established for at least two years to prevent post-mining effects on Stream "A". If removal occurs earlier, Division approval would first be sought and obtained.

3. Describe mitigation and/or special considerations that will minimize impact on the buffer zone while each activity is being conducted (*i.e., sumps, silt fencing, sediment control between affected areas and ponds during pond construction, stream diversion and/or relocation*).

Sumps, silt fencing, and/or hay bales will be utilized to prevent sediment accumulation within the buffer zone and Stream "A" during diversion ditch construction.

STREAM RECONSTRUCTION, DIVERSION OR RELOCATION PLANS

1. Describe in detail the measures to be taken to address issues of channel stability, flooding and sediment control, including a detailed description of sequencing and/or general timing of events.

The proposed activity will not affect channel stability. Sediment control facility Pond 012 is existing. Diversion ditches will be constured prior to any additional refuse disposal activities.

2. Identify specific engineering plan elements for restoration of environmental resources. Also identify important design elements such as reconstruction of pools and riffles, rock sizes, etc.

Restoration of environmental resources for this stream has taken place in close proximity to the disposal activities as described in Environmental Conditions, items 5. and 6. above.

REVEGETATION PLANS

1. Describe plans to revegetate affected buffer zone (*generally, revegetation should be with same type (herbaceous/woody) of plants, utilizing appropriate species*).

The following species and amounts of vegetation and/or trees and shrubs will be planted a minimum of 2 1/2 times the channel bottom width, or 50' whichever is greater, where disturbance within the buffer zone has occurred.

Species	Amount/Rate (lbs/Ac)
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Grasses and Legumes

Perennial Ryegrass	5 lbs/Ac.
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Foxtail Millet	5 lbs/Ac.
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Red Top	3 lbs/Ac.
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Birdsfoot Trefoil	5 lbs/Ac.
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Appalow Lespedeza	15 lbs/Ac.
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Trees and Shrubs

Shagbark Hickory

Willow	{ Rows will be spread 4' apart, with staggered 8' spacing.
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Sycamore

Trees will be planted by hand or machine as described above. Areas planted with riparian vegetation will not be cut or mowed in order to encourage development of volunteer vegetation. Species of trees, grasses and legumes which appear naturally will not be removed, but will remain in order to enhance the wildlife environment along the streams.

Care will be taken to disturb only that portion of the buffer zone necessary to accomplish the objectives of the permit. All work within the buffer zone will be performed in a timely and workmenlike manner to prohibit as best can be accomplished, additional effects on the existing stream channels.

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINERAL RESOURCES MANAGEMENT

STREAM BUFFER ZONE VARIANCE REQUEST

Applicant's Name **American Energy Corporation**

Name of Mine: Century Mine

Stream Identification: **Stream "S"**

Type: ☒ Intermittent ☐ Perennial

ENVIRONMENTAL CONDITIONS:

1. Provide a description of the stream's pre-mining water quality/quantity.

Water quality in Stream "S" is fair. Water analysis conducted quarterly at downstream site D-8A shows slightly elevated specific conductance and sulfates. Stream quantities range from 0 to < 1 gpm.

2. Provide a description of the existing environmental conditions, including riparian vegetation and physical habitat conditions. (*Habitat conditions such as headwater streams, meanders, pools, unique habitat/vegetation must be described even if stream channel is not to be affected.*)

The stream channel consist of substrates of cobble and gravel originating from shale, with moderate silt and normal embeddedness. Instream cover is maderate, with undercut banks, overhanging vegetation, rootmats and rootwads, boulders, and logs or woody debris. The riparian width is wide, consisting of forest/swamp, and shrub/oldfield, with none to little bank erosion. Maximum depth is 0.2 to 0.4 meter. Pool width is greater than riffle width with slow, intermittent and interstitial velocities. Channel morphology was indicated by moderate sinuosity, fair development, no channelization recovery and high stability. Modification such as canopy removal has occurred. Riparian vegetation consists of *Carya cordiformis*, *Parthenocissus quinquefolia*, *Rose multiflora*, *Sassafras albidum*, *Chrysanthemum leucanthemu*, *Achillea millefolium*, and *Solidago rugosa*.

3. Describe factors influencing existing stream conditions, such as previous mining, commercial or agricultural development, recent logging activity, etc.

Runoff from pre-law refuse disposal has affected the quality of Stream "S", however, stream channel conditions have not been influenced by adjacent activities.

4. Identify measures to protect, restore and/or reclaim water and other environmental resources. (*Include sequencing of restoration activities, engineering designs/plans, erosion control measures and restoration of habitat qualities.*)

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Mitigation of stream and wetland impacts associated with the existing refuse disposal area have been completed through stream preservation and stream riparian enhancements along Long Run and Piney Creek, and creation of wetlands. The completed mitigation included all stream impacts when refuse disposal from the Century Mine began in December, 2002. In-place sediment and drainage control facilities will protect Stream "S" from impact.

5. Has a 401/404 permit application been submitted? ☐ Yes ☒ No If "no," please provide an explanation of why a permit is not required pursuant to the Clean Water Act, Sections 401/404.

The 401 Water Quality Certification issued on September 13, 2002, and 404 issued November 29, 2002 covers all activities and stream length proposed to be impacted via this A.R.P., however, Stream "S" will not be impacted by the proposed refuse disposal.

6. If wetlands exist within the buffer zone, provide a description of mitigation of the wetland area.

3.18 Ac. mitigative wetland construction was completed in the spring of 2008 in two separate areas along Long Run. No wetlands exist within the portion of the buffer zone that is within D-0425 permit limits.

BUFFER ZONE DISTURBANCE JUSTIFICATION

1. Briefly describe the reasons planned activities in each buffer zone are needed.

Additional space for refuse disposal is critical to the continued mining operation, however Stream "S" will not be impacted by the additional vertical and horizontal refuse disposal proposed.

2. What other less intrusive measures were considered prior to requesting a variance? Include options that were considered to prevent, minimize or mitigate adverse impacts to the buffer zone.

Stream "S" will not be impacted by the additional vertical and horizontal refuse disposal proposed. Less intrusive measures are therefore not applicable.

BUFFER ZONE ACTIVITIES

1. Describe each proposed activity that will impact the buffer zone, including specific locations (using linear stream measurements). Identify any areas of the stream channel or buffer zone that will be avoided.

Stream "S" will not be impacted by the additional vertical and horizontal refuse disposal proposed. The entire stream channel and buffer zone will be avoided.

2. Describe the duration (in relative timing and/or sequencing) that each activity will be occurring within the buffer zone.

Removal, grading and seeding of Pond 014 will be done in a timely manner in the first appropriate season after successful vegetation has been established for

at least two years to prevent post-mining effects on Stream "S". If removal occurs earlier, Division approval would first be sought and obtained.

3. Describe mitigation and/or special considerations that will minimize impact on the buffer zone while each activity is being conducted (*i.e., sumps, silt fencing, sediment control between affected areas and ponds during pond construction, stream diversion and/or relocation*).

Should the area ever be disturbed, sumps, silt fencing, and/or hay bales will be utilized to prevent sediment accumulation within the within the buffer zone of Stream "S".

STREAM RECONSTRUCTION, DIVERSION OR RELOCATION PLANS

1. Describe in detail the measures to be taken to address issues of channel stability, flooding and sediment control, including a detailed description of sequencing and/or general timing of events.

N/A, Stream "S" will not be impacted by the additional vertical and horizontal refuse disposal proposed. Pond 014 is existing.

2. Identify specific engineering plan elements for restoration of environmental resources. Also identify important design elements such as reconstruction of pools and riffles, rock sizes, etc.

N/A, Stream "S" will not be impacted by the additional vertical and horizontal refuse disposal proposed.

REVEGETATION PLANS

1. Describe plans to revegetate affected buffer zone (*generally, revegetation should be with same type (herbaceous/woody) of plants, utilizing appropriate species*).

N/A, Stream "S" will not be impacted by the additional vertical and horizontal refuse disposal proposed.

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINERAL RESOURCES MANAGEMENT

STREAM BUFFER ZONE VARIANCE REQUEST

Applicant's Name **American Energy Corporation**

Name of Mine: Century Mine

Stream Identification: **Stream "Y"**

Type: ☒ Intermittent ☐ Perennial

ENVIRONMENTAL CONDITIONS:

1. Provide a description of the stream's pre-mining water quality/quantity.

Water quality in Stream "Y" is fair. Water analysis conducted at CMS-5 shows slightly elevated sulfates and specific conductance. Flow rates are generally less than 1 gpm.

2. Provide a description of the existing environmental conditions, including riparian vegetation and physical habitat conditions. (*Habitat conditions such as headwater streams, meanders, pools, unique habitat/vegetation must be described even if stream channel is not to be affected.*)

The stream channel consists of substrates of silt and gravel originating from shale, with normal silt and embeddedness. Instream cover is nearly absent and non-functional. The riparian width is wide, consists of forest/swamp, with none to little bank erosion. Maximum depth is <0.2 meters. Pool width is lesser than riffle width with slow, intermittent and interstitial velocities. Channel morphology was indicated by low sinuosity, poor development, no channelization recovery and moderate stability. Modification such as canopy removal may have occurred. Riparian vegetation consists of *Carya cordiformis*, *Parthenocissus quinquefolia*, *Rose multiflora*, *Sassafras albidum*, *Chrysanthemum leucanthemum*, *Achillea millefolium*, and *Solidago rugosa*.

3. Describe factors influencing existing stream conditions, such as previous mining, commercial or agricultural development, recent logging activity, etc.

Runoff from pre-law refuse disposal has affected the quality of Stream "Y", however, stream channel conditions have not been influenced by adjacent activities.

4. Identify measures to protect, restore and/or reclaim water and other environmental resources. (*Include sequencing of restoration activities, engineering designs/plans, erosion control measures and restoration of habitat qualities.*)

Mitigation of stream and wetland impacts associated with the existing refuse disposal area have been completed through stream preservation and stream riparian enhancements along Long Run and Piney Creek, and creation of a wetland. The completed mitigation included impacts to the remaining portion of Stream "A" when refuse disposal from the Century Mine began in December, 2002. The Stream "Y" channel will not be impacted by the proposed refuse disposal.

5. Has a 401/404 permit application been submitted? ☐ Yes ☒ No If "no," please provide an explanation of why a permit is not required pursuant to the Clean Water Act, Sections 401/404.

The 401 Water Quality Certification issued on September 13, 2002, and 404 issued November 29, 2002 covers all activities and stream length proposed to be impacted via this A.R.P., however, Stream "Y" will not be impacted by the proposed refuse disposal.

6. If wetlands exist within the buffer zone, provide a description of mitigation of the wetland area.

3.18 Ac. mitigative wetland construction was completed in the spring of 2008 in two separate areas along Long Run. No wetlands exist within the portion of the buffer zone that is within D-0425 permit limits.

BUFFER ZONE DISTURBANCE JUSTIFICATION

1. Briefly describe the reasons planned activities in each buffer zone are needed.

Additional space for refuse disposal is critical to the continued mining operation, however Stream "Y" will not be impacted by the additional vertical and horizontal refuse disposal proposed.

2. What other less intrusive measures were considered prior to requesting a variance? Include options that were considered to prevent, minimize or mitigate adverse impacts to the buffer zone.

Stream "Y" will not be impacted by the additional vertical and horizontal refuse disposal proposed. Less intrusive measures are therefore not applicable.

BUFFER ZONE ACTIVITIES

1. Describe each proposed activity that will impact the buffer zone, including specific locations (using linear stream measurements). Identify any areas of the stream channel or buffer zone that will be avoided.

Stream "Y" will not be impacted by the additional vertical and horizontal refuse disposal proposed. The entire stream channel and buffer zone will be avoided.

2. Describe the duration (in relative timing and/or sequencing) that each activity will be occurring within the buffer zone.

Stream "Y" will not be impacted by the additional vertical and horizontal refuse disposal proposed.

3. Describe mitigation and/or special considerations that will minimize impact on the buffer zone while each activity is being conducted (*i.e., sumps, silt fencing, sediment control between affected areas and ponds during pond construction, stream diversion and/or relocation*).

Should the area ever be disturbed, sumps, silt fencing, and/or hay bales will be utilized to prevent sediment accumulation within the buffer zone and Stream "Y".

STREAM RECONSTRUCTION, DIVERSION OR RELOCATION PLANS

1. Describe in detail the measures to be taken to address issues of channel stability, flooding and sediment control, including a detailed description of sequencing and/or general timing of events.

N/A, Stream "Y" will not be impacted by the additional vertical and horizontal refuse disposal proposed.

2. Identify specific engineering plan elements for restoration of environmental resources. Also identify important design elements such as reconstruction of pools and riffles, rock sizes, etc.

N/A, Stream "Y" will not be impacted by the additional vertical and horizontal refuse disposal proposed.

REVEGETATION PLANS

1. Describe plans to revegetate affected buffer zone (*generally, revegetation should be with same type (herbaceous/woody) of plants, utilizing appropriate species*).

N/A, Stream "Y" will not be impacted by the additional vertical and horizontal refuse disposal proposed.

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINERAL RESOURCES MANAGEMENT

STREAM BUFFER ZONE VARIANCE REQUEST

Applicant's Name **American Energy Corporation**

Name of Mine: **Century Mine**

Stream Identification: **Stream "I-13"**

Type: ☒ Intermittent ☐ Perennial

ENVIRONMENTAL CONDITIONS:

1. Provide a description of the stream's pre-mining water quality/quantity.

Water quality in I-13 is fair to good. Water analysis conducted prior to permit submission in surface water samples in close proximity indicated that all parameters are within effluent limitations.

2. Provide a description of the existing environmental conditions, including riparian vegetation and physical habitat conditions. (*Habitat conditions such as headwater streams, meanders, pools, unique habitat/vegetation must be described even if stream channel is not to be affected.*)

Substrate consists of cobble and gravel, silt and leaf pack debris. Maximum pool depth is >5 to 10 cm, with bankfull width >1.5 to 3.0 m. The riparian zone is wide on both banks with immature forest, shrub or old field. The stream is flowing with sinuosity of 2.0 for every 200 feet of channel. Stream gradient is moderate to severe. Riparian vegetation consists of Rosa multiflora, Anodropogan virginicus, Poa pratensis, Platago major, and solidago sp.

3. Describe factors influencing existing stream conditions, such as previous mining, commercial or agricultural development, recent logging activity, etc.

Runoff from pre-law refuse disposal operations may have affected the quality of Stream I-13, however, stream channel conditions have not been influenced by adjacent activities.

4. Identify measures to protect, restore and/or reclaim water and other environmental resources. (*Include sequencing of restoration activities, engineering designs/plans, erosion control measures and restoration of habitat qualities.*)

Mitigation of stream and wetland impacts associated with the existing refuse disposal area have been completed through stream preservation and stream riparian enhancements along Long Run and Piney Creek, and creation of a

wetland. The Stream I-13 channel will not be impacted by the proposed refuse disposal operations.

5. Has a 401/404 permit application been submitted? ☐ Yes ☒ No If "no," please provide an explanation of why a permit is not required pursuant to the Clean Water Act, Sections 401/404.

The 401 Water Quality Certification issued on September 13, 2002, and 404 issued November 29, 2002 covers all activities and stream length proposed to be impacted via this A.R.P., however, Stream I-13 will not be impacted by the proposed refuse disposal.

6. If wetlands exist within the buffer zone, provide a description of mitigation of the wetland area.

3.18 Ac. mitigative wetland construction was completed in the spring of 2008 in two separate areas along Long Run. No wetlands exist within the portion of the buffer zone that is within D-0425 permit limits.

BUFFER ZONE DISTURBANCE JUSTIFICATION

1. Briefly describe the reasons planned activities in each buffer zone are needed.

Additional space for refuse disposal is critical to the continued mining operation, however Stream I-13 will not be impacted by the additional vertical and horizontal refuse disposal proposed.

2. What other less intrusive measures were considered prior to requesting a variance? Include options that were considered to prevent, minimize or mitigate adverse impacts to the buffer zone.

Stream I-13 will not be impacted by the additional vertical and horizontal refuse disposal proposed. Less intrusive measures are therefore not applicable.

BUFFER ZONE ACTIVITIES

1. Describe each proposed activity that will impact the buffer zone, including specific locations (using linear stream measurements). Identify any areas of the stream channel or buffer zone that will be avoided.

Stream I-13 will not be impacted by the additional vertical and horizontal refuse disposal proposed. The entire stream channel and buffer zone will be avoided.

2. Describe the duration (in relative timing and/or sequencing) that each activity will be occurring within the buffer zone.

Stream I-13 will not be impacted by the additional vertical and horizontal refuse disposal proposed.

3. Describe mitigation and/or special considerations that will minimize impact on the buffer zone while each activity is being conducted (*i.e., sumps, silt fencing, sediment*

control between affected areas and ponds during pond construction, stream diversion and/or relocation).

Should the area ever be disturbed, sumps, silt fencing, and/or hay bales will be utilized to prevent sediment accumulation within the buffer zone and Stream I-13.

STREAM RECONSTRUCTION, DIVERSION OR RELOCATION PLANS

1. Describe in detail the measures to be taken to address issues of channel stability, flooding and sediment control, including a detailed description of sequencing and/or general timing of events.

N/A, Stream I-13 will not be impacted by the additional vertical and horizontal refuse disposal proposed.

2. Identify specific engineering plan elements for restoration of environmental resources. Also identify important design elements such as reconstruction of pools and riffles, rock sizes, etc.

N/A, Stream I-13 will not be impacted by the additional vertical and horizontal refuse disposal proposed.

REVEGETATION PLANS

1. Describe plans to revegetate affected buffer zone (*generally, revegetation should be with same type (herbaceous/woody) of plants, utilizing appropriate species*).

N/A, Stream I-13 will not be impacted by the additional vertical and horizontal refuse disposal proposed.

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINERAL RESOURCES MANAGEMENT

STREAM BUFFER ZONE VARIANCE REQUEST

Applicant's Name **American Energy Corporation**

Name of Mine: Century Mine

Stream Identification: **Stream I-14**

Type: ☒ Intermittent ☐ Perennial

ENVIRONMENTAL CONDITIONS:

1. Provide a description of the stream's pre-mining water quality/quantity.

Water quality in I-14 is fair to good. Water analysis conducted prior to permit submission in surface water samples in close proximity indicated that all parameters are within effluent limitations.

2. Provide a description of the existing environmental conditions, including riparian vegetation and physical habitat conditions. (*Habitat conditions such as headwater streams, meanders, pools, unique habitat/vegetation must be described even if stream channel is not to be affected.*)

Existing environmental conditions consists of a substrate of cobble and gravel, silt and leaf pack debris. Maximum pool depth is >5 to 10 cm, with bankfull width >1.5 to 3.0 m. The riparian zone is wide on both banks with immature forest, shrub or old field. The stream is flowing with sinuosity of 2.0 for every 200 feet of channel. Stream gradient is moderate to severe. Riparian vegetation consists of Rosa multiflora, Anodropogan virginicus, Poa pratensis, Platago major, and Solidago sp.

3. Describe factors influencing existing stream conditions, such as previous mining, commercial or agricultural development, recent logging activity, etc.

Construction of drainage control/sedimentation facility Pond 014 has affected the upper portion of the buffer zone of Stream I-14, however, the stream channel has not been impacted by this construction.

4. Identify measures to protect, restore and/or reclaim water and other environmental resources. (*Include sequencing of restoration activities, engineering designs/plans, erosion control measures and restoration of habitat qualities.*)

Mitigation of stream and wetland impacts associated with the existing refuse disposal area have been completed through stream preservation and stream riparian enhancements along Long Run and Piney Creek, and creation of a

wetland. The I-14 stream channel will not be disturbed by the proposed refuse disposal.

5. Has a 401/404 permit application been submitted? ☐ Yes ☒ No If "no," please provide an explanation of why a permit is not required pursuant to the Clean Water Act, Sections 401/404.

The 401 Water Quality Certification issued on September 13, 2002, and 404 issued November 29, 2002 covers all activities and stream length proposed to be impacted via this A.R.P., however, the Stream I-14 channel will not be impacted by the proposed refuse disposal.

6. If wetlands exist within the buffer zone, provide a description of mitigation of the wetland area.

3.18 Ac. mitigative wetland construction was completed in the spring of 2008 in two separate areas along Long Run. No wetlands exist within the impacted portion of the buffer zone of Stream I-14.

BUFFER ZONE DISTURBANCE JUSTIFICATION

1. Briefly describe the reasons planned activities in each buffer zone are needed.

Additional space for refuse disposal is critical to the continued mining operation.

2. What other less intrusive measures were considered prior to requesting a variance? Include options that were considered to prevent, minimize or mitigate adverse impacts to the buffer zone.

Less intrusive measures have been considered in the design of the additional vertical and horizontal refuse disposal proposed. Where ever possible, disposal limits have been kept within the current limits of the existing refuse disposal area.

BUFFER ZONE ACTIVITIES

1. Describe each proposed activity that will impact the buffer zone, including specific locations (using linear stream measurements). Identify any areas of the stream channel or buffer zone that will be avoided.

The construction of Pond 014 has affected the upper approximate 20' x 130' of the buffer zone of Stream I-14, however, did not impact the stream channel. No additional bufferzone impst is anticipated.

2. Describe the duration (in relative timing and/or sequencing) that each activity will be occurring within the buffer zone.

Pond 014 will be left in place for the life of the disposal area. Pond construction and revegetation has occurred. Removal, grading and seeding of the pond will be done in a timely manner in the first appropriate season after successful vegetation has been established for at least two years to prevent post-mining

effects on Stream I-14. If removal occurs earlier, Division approval would first be sought and obtained.

3. Describe mitigation and/or special considerations that will minimize impact on the buffer zone while each activity is being conducted (*i.e., sumps, silt fencing, sediment control between affected areas and ponds during pond construction, stream diversion and/or relocation*).

Sumps, silt fencing, and/or hay bales were utilized to prevent sediment accumulation within the buffer zone and Stream I-14 during pond construction.

STREAM RECONSTRUCTION, DIVERSION OR RELOCATION PLANS

1. Describe in detail the measures to be taken to address issues of channel stability, flooding and sediment control, including a detailed description of sequencing and/or general timing of events.

The proposed activity will not affect channel stability. Sediment control facility Pond 014 is existing.

2. Identify specific engineering plan elements for restoration of environmental resources. Also identify important design elements such as reconstruction of pools and riffles, rock sizes, etc.

Restoration of environmental resources for this stream are not necessary, the stream channel will not be disturbed.

REVEGETATION PLANS

1. Describe plans to revegetate affected buffer zone (*generally, revegetation should be with same type (herbaceous/woody) of plants, utilizing appropriate species*).

The following species and amounts of vegetation and/or trees and shrubs were planted a minimum of 2 1/2 times the channel bottom width, or 50 feet, whichever is greater, where disturbance within the buffer zone occurred.

Species	Amount/Rate (lbs/Ac)
Grasses and Legumes	
Perennial Ryegrass	5 lbs/Ac.
Foxtail Millet	5 lbs/Ac.
Red Top	3 lbs/Ac.
Birdsfoot Trefoil	5 lbs/Ac.
Appalow Lespedeza	15 lbs/Ac.
Trees and Shrubs	

Shagbark Hickory

Willow { Rows will be spread 4' apart, with staggered 8' spacing.

Sycamore

Trees will be planted by hand or machine as described above. Areas planted with riparian vegetation will not be cut or mowed in order to encourage development of volunteer vegetation. Species of trees, grasses and legumes which appear naturally will not be removed, but will remain in order to enhance the wildlife environment along the streams.

Care will be taken to disturb only that portion of the buffer zone necessary to accomplish the objectives of the permit. All work within the buffer zone will be performed in a timely and workmanlike manner to prohibit as best can be accomplished, additional effects on the existing stream channels.

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINERAL RESOURCES MANAGEMENT

STREAM BUFFER ZONE VARIANCE REQUEST

Applicant's Name **American Energy Corporation**

Name of Mine: Century Mine

Stream Identification: **Stream "I-15"**

Type: ☒ Intermittent ☐ Perennial

ENVIRONMENTAL CONDITIONS:

1. Provide a description of the stream's pre-mining water quality/quantity.

Water quality in I-15 is fair to good. Water analysis conducted prior to permit submission in surface water samples in close proximity indicated that all parameters are within effluent limitations.

2. Provide a description of the existing environmental conditions, including riparian vegetation and physical habitat conditions. (*Habitat conditions such as headwater streams, meanders, pools, unique habitat/vegetation must be described even if stream channel is not to be affected.*)

Existing environmental conditions consists of a substrate of cobble and gravel, silt and leaf pack debris. Maximum pool depth is >5 to 10 cm, with bankfull width >1.5 to 3.0 m. The riparian zone is wide on both banks with immature forest, shrub or old field. The stream is flowing with sinuosity of 2.0 for every 200 feet of channel. Stream gradient is moderate to severe. Riparian vegetation consists of Rosa multiflora, Anodropogan virginicus, Poa pratensis, Platago major, and Solidago sp.

3. Describe factors influencing existing stream conditions, such as previous mining, commercial or agricultural development, recent logging activity, etc.

Stream I-15 conditions do not appear to have been influenced by adjacent activities.

4. Identify measures to protect, restore and/or reclaim water and other environmental resources. (*Include sequencing of restoration activities, engineering designs/plans, erosion control measures and restoration of habitat qualities.*)

Mitigation of stream and wetland impacts associated with the existing refuse disposal area have been completed through stream preservation and stream riparian enhancements along Long Run and Piney Creek, and creation of a wetland. Stream I-15 will not be disturbed by the proposed refuse disposal.

5. Has a 401/404 permit application been submitted? ☐ Yes ☒ No If "no," please provide an explanation of why a permit is not required pursuant to the Clean Water Act, Sections 401/404.

The 401 Water Quality Certification issued on September 13, 2002, and 404 issued November 29, 2002 covers all activities and stream length proposed to be impacted via this A.R.P., however, Stream I-15 will not be impacted by the proposed refuse disposal.

6. If wetlands exist within the buffer zone, provide a description of mitigation of the wetland area.

3.18 Ac. mitigative wetland construction was completed in the spring of 2008 in two separate areas along Long Run. No wetlands exist within the portion of the buffer zone that is within D-0425 permit limits.

BUFFER ZONE DISTURBANCE JUSTIFICATION

1. Briefly describe the reasons planned activities in each buffer zone are needed.

Additional space for refuse disposal is critical to the continued mining operation, however, Stream I-15 will not be impacted by the additional vertical and horizontal refuse disposal proposed.

2. What other less intrusive measures were considered prior to requesting a variance? Include options that were considered to prevent, minimize or mitigate adverse impacts to the buffer zone.

Stream I-15 will not be impacted by the additional vertical and horizontal refuse disposal proposed. Less intrusive measures are therefore not applicable.

BUFFER ZONE ACTIVITIES

1. Describe each proposed activity that will impact the buffer zone, including specific locations (using linear stream measurements). Identify any areas of the stream channel or buffer zone that will be avoided.

Stream I-15 will not be impacted by the additional vertical and horizontal refuse disposal proposed. The entire stream channel and buffer zone will be avoided.

2. Describe the duration (in relative timing and/or sequencing) that each activity will be occurring within the buffer zone.

Stream I-15 will not be impacted by the additional vertical and horizontal refuse disposal proposed.

3. Describe mitigation and/or special considerations that will minimize impact on the buffer zone while each activity is being conducted (*i.e., sumps, silt fencing, sediment control between affected areas and ponds during pond construction, stream diversion and/or relocation*).

Should the area ever be disturbed, sumps, silt fencing, and/or hay bales will be utilized to prevent sediment accumulation within the buffer zone and Stream I-15.

STREAM RECONSTRUCTION, DIVERSION OR RELOCATION PLANS

1. Describe in detail the measures to be taken to address issues of channel stability, flooding and sediment control, including a detailed description of sequencing and/or general timing of events.

N/A, Stream I-15 will not be impacted by the additional vertical and horizontal refuse disposal proposed.

2. Identify specific engineering plan elements for restoration of environmental resources. Also identify important design elements such as reconstruction of pools and riffles, rock sizes, etc.

N/A, Stream I-15 will not be impacted by the additional vertical and horizontal refuse disposal proposed.

REVEGETATION PLANS

1. Describe plans to revegetate affected buffer zone (*generally, revegetation should be with same type (herbaceous/woody) of plants, utilizing appropriate species*).

N/A, Stream I-15 will not be impacted by the additional vertical and horizontal refuse disposal proposed.



State of Ohio Environmental Protection Agency

STREET ADDRESS:

Ohio Government Center
22 S. Front Street
Columbus, OH 43215-1099

TELE: (614) 644-3020 FAX: (614) 644-8229

OHIO E.P.A.

MAILING ADDRESS:

P.O. Box 1049
Columbus, OH 43216-1049

ENTERED DIRECTOR'S JOURNAL

Certified Mail

September 13, 2002

American Energy Corporation
Attn: Robert D. Moore, President
43521 Mayhugh Hill Road
Township Highway 88
Beallsville, Ohio 43716

I certify this to be a true and accurate copy of the
official documents and records of the Ohio
Environmental Protection Agency

Zona L. Clements 9/13/02

Re: Belmont County / Wayne Township
Grant of Section 401 Water Quality Certification (Preferred Design Alternative)
Project to expand an existing valley fill coarse coal refuse disposal facility
Ohio EPA ID No.020724

Ladies and Gentlemen:

The Director of Ohio Environmental Protection Agency hereby authorizes the above referenced project under one or both of the following authorities.

Section 401 Water Quality Certification

Pursuant to Section 401 of the Federal Water Pollution Control Act, Public Law 95-217, the Director of Ohio Environmental Protection Agency hereby certifies that the above-referenced project will comply with the applicable provisions of Sections 301, 302, 303, 306, and 307 of the Federal Water Pollution Control Act.

Ohio Isolated Wetland Permit

Pursuant to Ohio Revised Code Chapter 6111 and Ohio Administrative Code Chapter 3745-1, and other applicable provisions of state law, the Director of Ohio Environmental Protection Agency hereby concludes that the above-referenced project will comply with the applicable provisions of Sections 6111.03 and 6111.04 of the Ohio Revised Code.

This authorization is specifically limited to a Section 401 Water Quality Certification and/or Ohio Isolated Wetlands permit with respect to water pollution and does not relieve the applicant of further certifications or Permits as may be necessary under the law. I have determined that a lowering of water quality in the Piney Creek watershed (05030106) as authorized by this certification/Ohio Isolated Wetlands Permit is necessary. I have made this determination based upon the consideration of all public comments, and including the technical, social, and economic considerations concerning this application and its impact on waters of the state.

Bob Taft, Governor
Maureen O'Connor, Lieutenant Governor
Christopher Jones, Director

I. Conditions

This Section 401 Water Quality Certification pertains to the Preferred Alternative, and is issued subject to the following modifications and/or conditions:

- A. The work shall take place during low flow conditions in order to minimize adverse impacts to water quality away from the project site.
- B. Fill used in this project shall consist of suitable material free from toxic contaminants in other than trace quantities.
- C. Steps shall be taken during construction to minimize bank erosion.
- D. Steps shall be taken upon completion of this project, to ensure bank stability. This may include but is not limited to, the placement of riprap or bank seeding.
- E. Equipment shall be installed at the facility to eliminate the possibility of spills and control dust that may enter the waterway by runoff or point discharge.
- F. Any damages to the immediate environment of the project by equipment needed for construction or hauling will be repaired immediately.
- G. Within 60 days of the issuance date of this certification/permit, American Energy Corporation's submittal of an acceptable, notarized, recorded, and filed conservation easement with an acceptable 501(c)(3) organization. One 30-day extension will be allowed, if requested in writing prior to the deadline. The conservation easement shall protect, in perpetuity,
 - Piney Creek South - 1970 feet,
 - Piney Creek North - 2513 feet,
 - Unnamed Stream C- 1690 feet,
 - Unnamed Stream D- 1710 feet,
 - Unnamed Stream E- 610 feet,
 - Long Run - 2678 feet,
 - Wetland A- 2.66 acres

No fill may be placed in the streams or wetlands until the terms of this condition are met.

II. Impacts

- A. Streams- 7,161 linear feet of intermittent stream and 2,002 linear feet of ephemeral stream
- B. Wetlands- 1.8 acres

III. Mitigation

- A. Streams-
 - 1. Preservation of 6,688 ft, comprised of 2,678 feet of Long Run (Exceptional Warmwater Habitat), 1,710 feet of unnamed Stream D, 1,690 feet of unnamed Stream C, and 610 feet of Stream E, via conservation easement.
 - 2. Enhancement to 4,483 feet of Piney Creek, comprised of 1,970 ft south of site and 2,513 feet north of site, via planting of trees and shrubs in the riparian zone, per page M2 of the applicants mitigation plan and drawing 20.
- B. Wetlands- Creation and preservation via conservation easement of 2.66 acres of wetland. The wetland shall be created from the existing abandoned freshwater pond, by the lowering of the dam and planting of wetland vegetation.
- C. Buffers - The site will be graded to provide more gentle slopes to reduce the amount of siltation reaching the wetland. The 50 ft wide perimeter buffer will be planted with hardwoods, conifers and grasses, according to the Wetland Construction Drawing #20.

IV. Monitoring

- A. Streams - QHEI's should be performed annually on each of the 6 reaches under conservation easement, with the goal of improving the existing QHEI of each reach, at the end of 5 years.
- B. Wetlands- Per the applicant's monitoring plan (pages M8, M10)

- C. **Reporting Requirements-** Annual water quality, hydrology, soils, and vegetation surveys shall be conducted. A report containing these data shall be submitted to Ohio EPA for each of five consecutive years following completion of wetland and stream mitigation construction. The first annual report is due to Ohio EPA by December 31 of the full year following completion of mitigation construction. All subsequent reports shall be submitted by December 31st of each of the five monitoring years.

V. Mitigation Performance Criteria

- A. **Streams-**
 - Piney Creek South - QHEI > 59
 - Piney Creek North - QHEI > 59
 - Unnamed Stream C- QHEI > 45
 - Unnamed Stream D- QHEI > 66.5
 - Unnamed Stream E- QHEI > 54.5
 - Long Run - QHEI > 78
- B. **Wetlands-** 2.66 acres of category 2 or 3 non-forested wetland.

- VI. **Timing of Mitigation** - No fill may be placed in the streams or wetlands until the terms of condition I.G. are met.
- VII. **Notifications to Ohio EPA** - The applicant shall inform Ohio EPA by letter providing the date of completion of the wetland and stream mitigation. The shall reference the following information:
 - American Energy Corp
 - Century Mine Project
 - Ohio EPA ID# 020724
- VIII. **Third-Year Site Review** - The applicant shall arrange an on-site mitigation meeting with Ohio EPA during the growing season after the third year report has been submitted. The purpose of this inspection is to determine if the mitigation project has been constructed in accordance with the agreement between the applicant and Ohio EPA.
- IX. **Contingency Plans** - If the wetland mitigation site is not performing as proposed by the end of the fifth year of post construction monitoring, the monitoring period may be extended and or the applicant may be required to revise the existing mitigation site or seek out new or additional wetland mitigation areas. The contingency plan supplied by the applicant is approved, except for the proposed use of riprap to stabilize bank erosion.

If necessary, Ohio EPA may make recommendations to improve the wetland. The applicant is responsible for undertaking any reasonable modifications identified by Ohio EPA.

Within five (5) years after completion of construction of the mitigation wetlands dedicated for the Century Mine project, the applicant shall have developed a minimum of 2.66 acres of jurisdictional Category 2 and/or 3 non forested wetlands.

Monitoring Criteria:

The reports shall contain, at a minimum, the following information:

As-built Drawings: An 8.5 by 11 inch as-built drawing of the mitigation wetland (first year only).

Water Chemistry Monitoring: A grab sample shall be collected in May of each monitoring year in each wetland mitigation area. The samples shall be analyzed for ammonia, nitrates, nitrite, carbon, total sulfates, total iron, total manganese, specific conductivity, pH, turbidity, total suspended solids, heavy metals and biochemical oxygen demand.

Hydrology Monitoring: Water level data shall be collected in May and late August of each monitoring year. Ground water levels shall be measured in the absence of inundated conditions.

Soils Monitoring: A minimum of one soil probe or test pit per acre of mitigated wetland shall be collected. Describe the soil profile and hydric soil indicators. Indicate the soil map unit name (soil series and phase) and the taxonomic subgroup.

Vegetation Monitoring: The location and name of each plant community type within the mitigation area and buffer area shall be marked on a scaled drawing or scaled aerial photograph (base map) and named.

A representative observation point shall be selected in each plant community type in each distinct wetland mitigation area. This shall be a point which best represents the characteristics of the entire plant community. The observation points shall be marked on the base map.

American Energy Corporation
September 13, 2002
Page 6

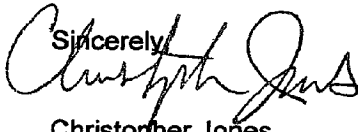
The dominant plant species shall be visually determined in each vegetation layer of each community type, and the scientific names of these species shall be included in the report. Dominant species are those species which have the greatest relative basal area (woody overstory), greatest height (woody overstory), greatest percentage of aerial coverage (herbaceous understory), and/or greatest number of stems (woody vines).

The applicant shall conduct delineation of the restored mitigation wetland during the growing season of the fifth year after completion of construction of the mitigation wetlands using the United States Army Corps of Engineers 1987 Wetland Delineation Manual (or successor document).

Miscellaneous

The applicant is responsible for ensuring that the wetland is not filled, drained, or otherwise converted to upland. If the property is sold, the deed shall ensure that the wetland will not be filled, drained, or otherwise converted to upland.

You are hereby notified that this action of the Director is final and may be appealed to the Environmental Review Appeals Commission pursuant to Section 3745.04 of the Ohio Revised Code by any person who was a party to this proceeding. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. It must be filed with the Environmental Review Appeals Commission within thirty (30) days after the notice of the Director's action. A copy of the appeal must be served on the Director of the Ohio Environmental Protection Agency and the Environmental Enforcement Section of the Office of the Attorney General within three (3) days of the filing with the Commission. An appeal may be filed with the Environmental Review Appeals Commission, 236 East Town Street, Room 300, Columbus, Ohio 43266-0557.

Sincerely,


Christopher Jones
Director

cc: Scott Hans, U.S. Army Corps of Engineers, Pittsburgh District
Mary Knapp, U.S. Fish & Wildlife Service
Scott Stiteler, ODNR
Kevin Pierard, U.S. EPA, Region 5
L. Fay, OEPA, DSW
M. Kuklis, OEPA, SEDO
401 file

AEC 09192

404 Clean Water Act
Century

November 29, 2002

Operations and Readiness Division
Regulatory Branch
200101542

Melanie Homan
American Energy Corporation
43521 Mayhugh Hill Road
Beallsville, Ohio 43716

Dear Ms. Homan:

I refer to your Department of the Army Permit Application, received in this office September 16, 2002, regarding your proposal to construct a valley fill coal refuse disposal site, near Armstrong Mills, Belmont County, Ohio. The project will impact 1.77 acres of wetland and 9,163 linear feet of intermittent and ephemeral stream channels which are unnamed tributaries to Piney Creek.

The project proposes to mitigate the impacts to aquatic resources by constructing 2.66 acres of wetland within an existing open water impoundment area, establishing 11,171 linear feet of easements along existing stream channels, and improving or restoring 5,223 linear feet of Piney Creek North, Piney Creek South and Long Run.

Activities associated with projects of this type are authorized by Nationwide Permit No. 21 (see enclosure), previously issued by the Corps of Engineers, for purposes of Section 404 of the Clean Water Act as published in the January 15, 2002 issue of the Federal Register.

Enclosed is a list of conditions which must be followed for the Nationwide Permit to be valid. Adherence to these conditions will permit you to proceed with the proposed project, with the inclusion of the following special conditions:

1. The Ohio Environmental Protection Agency issued a conditioned Section 401 Water Quality Certification, by letter dated September 13, 2002. These conditions are hereby incorporated as conditions of your Section 404 authorization.

2. Executed copies of all proposed conservation easements must be provided to this office not less than ten days prior to the start of construction, clearly identifying the length, width, and total area to be protected. All easement areas may not be less than 25 feet wide on each bank.

JUL 30 2010

AEC 09193

3. Annual monitoring reports of the stream and wetland mitigation areas must be submitted for five years following the start of construction.

4. The stream and wetland mitigation areas must be constructed prior to, or during the same construction season as the project impacts.

5. The wetland mitigation area must obtain 85% vegetative coverage, dominated by hydrophytic species, with no single species comprising greater than 50%, by completion of the third growing season, or corrective measures will be required.

6. As built drawings of the stream and wetland mitigation areas, and project impact areas must be submitted with each monitoring report.

Please Note, the attached Compliance Certification Form must be signed and returned to this office upon completion of the proposed aquatic resource impacts.

The verification of this Nationwide Permit is valid until November 29, 2005 unless the Nationwide Permit is modified, suspended, or revoked. If project specifications are changed or work has not been initiated before November 29, 2005, please contact this office for further approval.

The issuance of this Nationwide Permit will not relieve you of the responsibility to obtain any other required state, local, or Federal authorizations.

If you have any questions, please contact Scott A. Hans at (412) 395-7154.

Sincerely,

Albert H. Rogalla
Chief, Regulatory Branch

Enclosure

CF:

Ohio Environmental Protection Agency
Section 401 Coordinator
P. O. Box 1049
Columbus, OH 43266-0149

JUL 30 2010

AEC 09194

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINERAL RESOURCES MANAGEMENT

COAL WASTE PLAN

Applicant's Name American Energy Corporation

1. Identify the source of coal mine waste to be disposed of on the coal mining operation: (check appropriate response(s))
☒ Wash plant facility
☐ Tipple facility
☐ Other (Specify) None
2. Identify the type of coal mine waste to be disposed of on the coal mining operation: (check appropriate response(s))
☒ Course - dry
☐ Medium - dry
☐ Fine - dry
☐ Slurry - wet
☐ Other (Specify)
3. Submit Drilling Report - Surface for the material to include at a minimum: pH, percent of total or pyritic sulfur, neutralization potential, potential acidity and calcium carbonate deficiency. **See Drilling Report - Surface/Refuse Material**
4. Submit a laboratory analysis of the coal waste material identifying the size fraction percentages of the waste material. **See Drilling Report - Refuse Material Size Fractions**
5. Submit as an addendum a stability analysis to address how placement of the waste material will not cause instability within the backfilled area. Include all necessary calculations and analyses. **See Stability Analysis Report**
6. State the estimated amount of refuse material in tons to be disposed on the proposed permit area: 17 million tons of additional coarse coal refuse
7. Submit a laboratory analysis of the coal waste material identifying the moisture percentages and density of the refuse material, if the coal waste is from a wash plant. **See addendum to this item.**
8. Describe how infiltration of water into the disposal area will be minimized, and specifically describe how the disposal plan will comply with paragraph (J) of rule 1501:13-9-14 and paragraph (J) of rule 1501:13-9-04 of the Administrative Code.

Coal refuse will be compacted daily to increase density and reduce permeability. Refuse will be spread in horizontal lifts, two-foot thick maximum. Each lift will be compacted by a 10-ton roller. Further compaction will occur daily from traffic of 100-ton trucks (weight 102 tons) over the refuse. In addition to daily compaction, when refuse is filled to design elevations, the surface will be graded for proper drainage, and capped as described on drawings C-1 and C-2.

9. Does the disposal plan propose to neutralize wash plant waste with spoil material? ☐ Yes, ☒ No. If "yes," submit as an addendum an acid/base account of the refuse and spoil materials.
10. Does the disposal plan propose to seal the disposal area? ☒ Yes, ☐ No. If "yes," submit Drilling Report - Surface for the sealant material that includes pH, percent of total or pyritic sulfur, neutralization potential, potential acidity, calcium carbonate deficiency and lithology. **See Drilling Report-Surface/Clay Liner/Cap**
11. If a sealant material is to be used, submit a permeability analysis of the material to be used as a sealant. Also, address below how the sealant material will be compacted and the anticipated permeability coefficient to be achieved following compaction.

See Earthwork Quality Assurance/Quality Control Plan in the D-0425-2 Coarse Coal Refuse Permit

12. Submit a detailed plan for the disposal area. Ensure that Part 3, Item E of the permit application addresses the probable hydrologic consequences of the disposal area on the hydrologic regime of the area. Part 3, Item E must also identify the extent to which the disposal operation may result in contamination, diminution or interruption of a legitimately-used underground or surface supply of water and identifies acceptable alternative sources. **See ARP map and Drawings 1 of 5 through 5 of 5 for detail plans. The probable hydrologic consequences of the additional refuse being added to the top of the existing refuse disposal area will be negligible. Refuse has been stored within this approximate footprint for many years. Monitoring well nest CG-01-5A, CG-01-5B, & CG-01-5C has been permanently abandoned and replaced by nest CG-06-01-S & CG-06-01D. See attached approved ARP R-425-19. Analysis of the coal refuse and cap material indicates calcium carbonate excesses. Alkaline amendment for the top 30 inches of the final grade may not be necessary. If alkaline amendment material should be necessary, it will be placed on the refuse belt by mechanical means (bin, hopper, etc.) and co-mingled with the refuse for the top 30 inches of the final grade, or, will be spread uniformly over the surface of the graded refuse area by hand or machine, prior to compaction, in the last approximate 2 ½ feet of individual lifts placed. Additional testing of the top 30 inches of coal refuse material will be conducted to determine if alkaline ammendment is necessary. Based on the chemistry of the top 30 inches of coal refuse, the amount of alkaline material necessary to neutralize the refuse disposal area will be calculated, and submitted for approval to ODNR, DMRM.**
13. If the material to be disposed is slurry, submit data characterizing soil materials to be utilized in construction.
N/A
14. In Part 3, Item F, identify surface and ground water monitoring sites that will specifically determine hydrologic impact that may proximately occur as a result of the disposal plan. Describe in detail the monitoring plan and analytical procedures to be followed for this disposal plan. If monitoring wells are to be constructed as

part of this plan, submit information as to well construction, development and design. **The existing monitoring plan will continue for this proposed ARP. Also see response to item 12. above.**

15. In Part 3, Item F, address the NPDES/NSPS parameter limits and sampling frequencies to be met for the disposal area. **N/A - No additional ponds are proposed, current permit effluent limitations apply.**
16. Submit cross section(s) showing the elevation, final profile, saturated zones (existing and proposed), and reclaimed surface profile of the disposal area. **See Drawings C1 and C2.**
17. Show the location of the coal mine waste storage and disposal areas and the location of cross sections on the application map.

Part 3: Section A

DRILLING REPORT - SURFACE

Surface Owner American Energy Corporation
Test Hole # REFUSE MATERIAL Page 1 of 1
State Plane Coordinates X: Y:

Total Thickness	Surface elevation of test hole
0.00	0.00
0.01	0.00
0.02	0.00
0.03	0.00
0.04	0.00
0.05	0.00
0.06	0.00
0.07	0.00
0.08	0.00
0.09	0.00
0.10	0.00
0.11	0.00
0.12	0.00
0.13	0.00
0.14	0.00
0.15	0.00
0.16	0.00
0.17	0.00
0.18	0.00
0.19	0.00
0.20	0.00
0.21	0.00
0.22	0.00
0.23	0.00
0.24	0.00
0.25	0.00
0.26	0.00
0.27	0.00
0.28	0.00
0.29	0.00
0.30	0.00
0.31	0.00
0.32	0.00
0.33	0.00
0.34	0.00
0.35	0.00
0.36	0.00
0.37	0.00
0.38	0.00
0.39	0.00
0.40	0.00
0.41	0.00
0.42	0.00
0.43	0.00
0.44	0.00
0.45	0.00
0.46	0.00
0.47	0.00
0.48	0.00
0.49	0.00
0.50	0.00
0.51	0.00
0.52	0.00
0.53	0.00
0.54	0.00
0.55	0.00
0.56	0.00
0.57	0.00
0.58	0.00
0.59	0.00
0.60	0.00
0.61	0.00
0.62	0.00
0.63	0.00
0.64	0.00
0.65	0.00
0.66	0.00
0.67	0.00
0.68	0.00
0.69	0.00
0.70	0.00
0.71	0.00
0.72	0.00
0.73	0.00
0.74	0.00
0.75	0.00
0.76	0.00
0.77	0.00
0.78	0.00
0.79	0.00
0.80	0.00
0.81	0.00
0.82	0.00
0.83	0.00
0.84	0.00
0.85	0.00
0.86	0.00
0.87	0.00
0.88	0.00
0.89	0.00
0.90	0.00
0.91	0.00
0.92	0.00
0.93	0.00
0.94	0.00
0.95	0.00
0.96	0.00
0.97	0.00
0.98	0.00
0.99	0.00
1.00	0.00

Total Thickness	Surface elevation of test hole
0.00	0.00
0.01	0.01
0.02	0.02
0.03	0.03
0.04	0.04
0.05	0.05
0.06	0.06
0.07	0.07
0.08	0.08
0.09	0.09
0.10	0.10
0.11	0.11
0.12	0.12
0.13	0.13
0.14	0.14
0.15	0.15
0.16	0.16
0.17	0.17
0.18	0.18
0.19	0.19
0.20	0.20
0.21	0.21
0.22	0.22
0.23	0.23
0.24	0.24
0.25	0.25
0.26	0.26
0.27	0.27
0.28	0.28
0.29	0.29
0.30	0.30
0.31	0.31
0.32	0.32
0.33	0.33
0.34	0.34
0.35	0.35
0.36	0.36
0.37	0.37
0.38	0.38
0.39	0.39
0.40	0.40
0.41	0.41
0.42	0.42
0.43	0.43
0.44	0.44
0.45	0.45
0.46	0.46
0.47	0.47
0.48	0.48
0.49	0.49
0.50	0.50
0.51	0.51
0.52	0.52
0.53	0.53
0.54	0.54
0.55	0.55
0.56	0.56
0.57	0.57
0.58	0.58
0.59	0.59
0.60	0.60
0.61	0.61
0.62	0.62
0.63	0.63
0.64	0.64
0.65	0.65
0.66	0.66
0.67	0.67
0.68	0.68
0.69	0.69
0.70	0.70
0.71	0.71
0.72	0.72
0.73	0.73
0.74	0.74
0.75	0.75
0.76	0.76
0.77	0.77
0.78	0.78
0.79	0.79
0.80	0.80
0.81	0.81
0.82	0.82
0.83	0.83
0.84	0.84
0.85	0.85
0.86	0.86
0.87	0.87
0.88	0.88
0.89	0.89
0.90	0.90
0.91	0.91
0.92	0.92
0.93	0.93
0.94	0.94
0.95	0.95
0.96	0.96
0.97	0.97
0.98	0.98
0.99	0.99
1.00	1.00

(1) (1) If subsurface water was encountered, identify the stratum in which it was encountered by an asterisk (*)

Revised 02/06
DNR-744-9022

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINERAL RESOURCES MANAGEMENT

DRILLING REPORT - SURFACE

Applicant's Name American Energy Corporation
(Check one: ☐ core drilled ☐ rotary air, ☒ other (describe) Grab)

Surface Owner American Energy Corporation
Test Hole # REFUSE MATERIAL SIZE FRACTIONS Page 1 of 1
State Plane Coordinates X: Y:

Lithologic Unit (1)	Thickness	pH	CaCO ₃ Deficiency (1000 Tons)	Neutralization Potential (1000 Tons)	Potential Acidity	Total or Pyritic Sulfur %	Physical Properties (2)			
Topsoil	0.00	4.5-5.0	0.00	0.00	0.00	0.00				
Subsoil	0.00	4.5-5.0	0.00	0.00	0.00	0.00				
FRACTION SIZE	DISTRIBUTION									
Plus 2" square	40.31%									
2" x 1" square	26.77%									
1" x 1/2" square	23.17%									
1/2" square x 8 mesh	7.64%									
Minus 8 mesh	2.11%									

Coal Seam Information Total Thickness Surface elevation of test hole

NAME	NUMBER	TOTAL SULFUR %	PYRITE/MARCASITE SULFUR %
Roof material	Over #8 coal seam	2.42	2.18
Floor material	Below #8 coal seam	1.74	1.49

(1) If subsurface water was encountered, identify the stratum in which it was encountered by an asterisk (*)
(2) Describe any observable physical properties of each stratum (e.g. color, grain size, compactibility, erodibility, etc.)

Part 2: Section B

Permeability Test Report

ASTM D 5084 - Method C

Boring: TP-1

Press Tube: No

Sample: Bag Sample (Red Clay)

Depth:

Liquid Limit 39

Plasticity Index 17

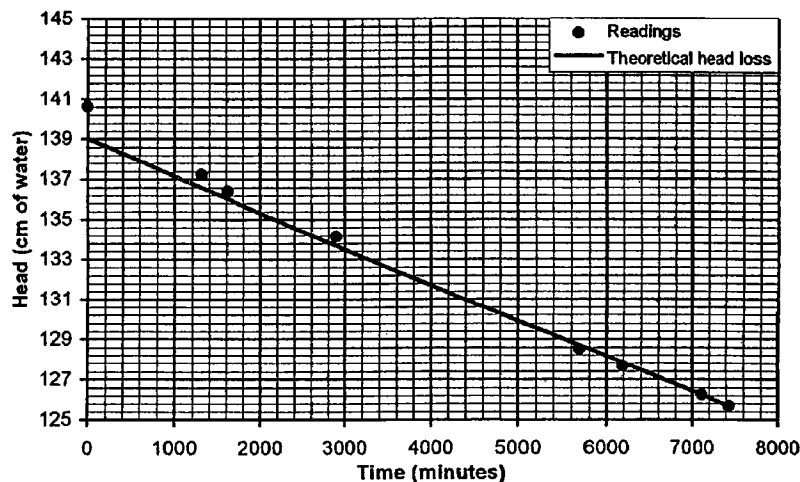
Specific Gravity 2.7

Permeant Liquid

De-aired, deionized water

Temp. (°C)

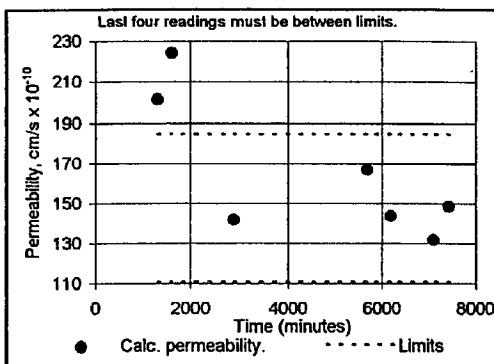
21.0



	Diameter (cm)	Area, A (cm ²)	Length, L (cm)	Moisture (%)	Dry Density (pcf)	Saturation (%)
Initial	7.163	40.30	7.564	24.2	99.3	93.9
Final	7.163	40.30	7.564	25.8	99.3	100.0

Chamber Pressure (psi)	Backpressure (psi)		Consolidation Stress (psi)		Hydraulic Gradient (-)		
	Inflow	Outflow	Max.	Min.	Max.	Min.	Avg.
60.0	58.0	56.0	4.0	2.0	18.6	16.6	17.6

Date	Time	Buret Readings		Flow Ratio	Head, h (cm)	k _{20°C} (cm/sec)
		Inflow	Outflow			
9/27/01	9:40	3.2	18.8	----	140.6	----
9/28/01	7:36	4.4	17.6	1.00	137.3	2.0E-08
9/28/01	12:36	4.7	17.3	1.00	136.4	2.2E-08
9/29/01	9:55	5.5	16.5	1.00	134.1	1.4E-08
10/1/01	8:35	7.5	14.5	1.00	128.5	1.7E-08
10/1/01	16:55	7.8	14.2	1.00	127.7	1.4E-08
10/2/01	8:12	8.3	13.7	1.00	126.3	1.3E-08
10/2/01	13:40	8.5	13.5	1.00	125.7	1.5E-08



$$k_{20^{\circ}\text{C}} = R_T \frac{aL}{2At} \ln \left(\frac{h_1}{h_2} \right) = 1.5\text{E-}08 \text{ cm/sec}$$

a - Area of burets (0.71 cm²)
 t - Elapsed time between readings
 R_T - Temperature correction factor = (0.980)

Remarks:

Sample was remolded to 98% of standard moisture density curve maximum dry density @ 2% wet of optimum moisture content.



Client: William J. Siplivy, P.E., CPG

Project: Century Mine

Job No: 0121-4543.00

Permeability Test Report

ASTM D 5084 - Method C

Boring: TP-2

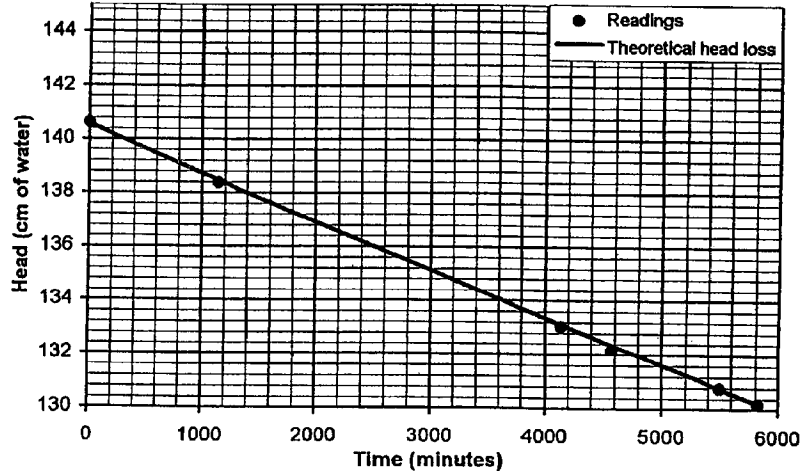
Press Tube: No

Sample: Bag Sample (Brown)

Depth:

Liquid Limit	40
Plasticity Index	19
Specific Gravity	2.7

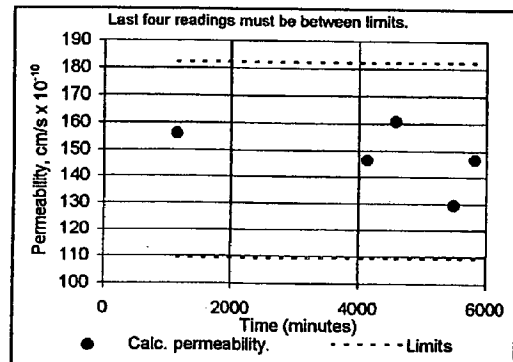
Permeant Liquid	De-aired, deionized water
Temp. (°C)	21.0



	Diameter (cm)	Area, A (cm ²)	Length, L (cm)	Moisture (%)	Dry Density (pcf)	Saturation (%)
Initial	7.148	40.12	7.668	25.2	98.3	95.3
Final	7.148	40.12	7.668	26.4	98.3	99.9

Chamber Pressure (psi)	Backpressure (psi)		Consolidation Stress (psi)		Hydraulic Gradient (-)		
	Inflow	Outflow	Max.	Min.	Max.	Min.	Avg.
60.0	58.0	56.0	4.0	2.0	18.3	17.0	17.7

Date	Time	Buret Readings		Flow Ratio	Head, h (cm)	k _{20°C} (cm/sec)
		Inflow	Outflow			
9/28/01	12:36	1.9	16.1	—	140.6	—
9/29/01	7:45	2.7	15.3	1.00	138.4	1.6E-08
10/1/01	9:35	4.6	13.4	1.00	133.0	1.5E-08
10/1/01	16:55	4.9	13.1	1.00	132.2	1.6E-08
10/2/01	8:13	5.4	12.6	1.00	130.8	1.3E-08
10/2/01	13:40	5.6	12.4	1.00	130.2	1.5E-08



$$k_{20^{\circ}\text{C}} = R_T \frac{aL}{2At} \ln \left(\frac{h_1}{h_2} \right) = 1.5\text{E-}08 \text{ cm/sec}$$

a - Area of burets (0.71 cm²)
 t - Elapsed time between readings
 R_T - Temperature correction factor = (0.980)

Remarks:

Sample was remolded to 98% of standard moisture density curve maximum dry density @ 2% wet of optimum moisture content.



Client: William J. Siplivy, P.E., CPG
 Project: Century Mine
 Job No: 0121-4543.00

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF RECLAMATION

ATTACHMENT 12
(DRILLING-REPORT - SURFACE MINE)

(Check one: core drilled rotary air, X other (describe) Grab Grab)

Test Hole # REFUSE MATERIAL SIZE FRACTIONS

State Plane Coordinates X

Addendum to Coal Waste Plan Item 4., American Energy Corp.

[illegible]

(Dry Basis)

Coal Seam Information

[illegible]

(1) If subsurface water was encountered, identify the stratum in which it was encountered by an asterisk (*)

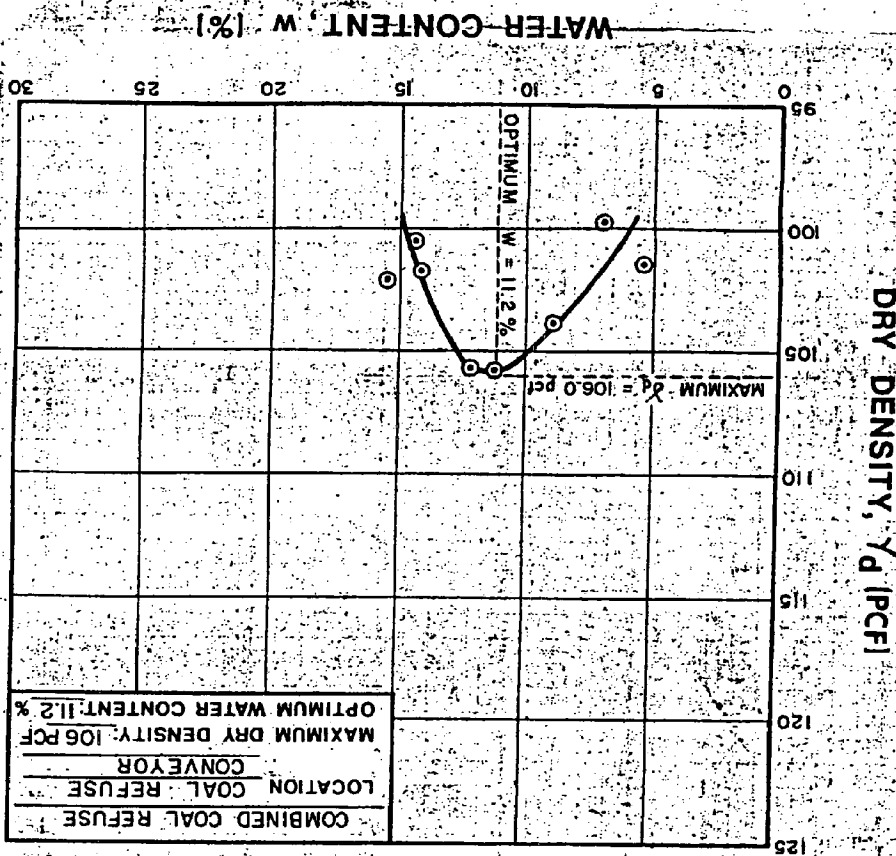
(2) Describe any observable physical properties of each stratum (e.g. color, grain size, compactibility, erodibility, etc.)

AEC 09203

Addendum to Coal Waste Plan Item 7., American Energy Corp.

WILLIAM J. SIPLIVY, P.E., C.R.G.
 Geotechnical Engineer
 4667 Turnberry Trail
 Stow, OH 44224

NAME Century Mine
 NUMBER Coal Refuse Moist & Density
 SHEET NO. 1 OF 1
 DATE 30 Nov 2001



ASTM DESIGNATION USED STANDARD
 **METHOD USED C-
 LAYERS
 HAM/DROP
 STANDARD-0698
 MODIFIED-01597
 10" / 10"
 5

METHOD	MATERIAL SIZE	MOLD SIZE	BLOWS
A	ALL PASSING #4	4" DIA.	25
B	ALL PASSING #4	6" DIA.	50
C	ALL PASSING #4	8" DIA.	25
D	ALL PASSING #4	8" DIA.	50

Taken From
 YAO Coal Company
 Allsion Mine Refuse
 File Reclamation Plan
 OSHA Permit D-0425
 Performed By:
 D'Appolonia
 CONSULTING ENGINEERS
 See Dwg. No. 81-250-E2

COMPACTION TEST

Addendum to A.R.P, Item 4.
American Energy Corporation

The operational plan for the additional refuse disposal at this site virtually mirrors that currently being utilized for refuse disposal at the site. The horizontal limits of the additional refuse disposal proposed is slightly within the approved refuse limits in the north/northeast, and slightly outside the existing approved limits in the northwest and west. The southeast corner of the proposed additional disposal limits extend, at the farthest point, approximately 550 feet past the current limits of refuse disposal, however are within the limits of the previously approved D-0425-2 limits. The vertical extension of refuse disposal will expand from the currently approved maximum elevation of 1288.6 to 1355, a rise of 66.4 feet. Please refer to drawings 1 of 5 through 5 of 5 for details. Downdrains will be installed as necessary to carry water safely from the disposal site. See Downdrain Profile and Details on drawing 4 of 5. The liner beneath the expanded portions of the disposal area will be consistent with the existing liner, and will tie into the existing liner utilizing a "beveled" design as shown on Drawing 2 of 5. The waste that existed at the time American Energy Corporation began disposal operations in 2001 is not exposed. The site was resoiled and seeded in the early 1980's. The refuse disposal proposed by this ARP will not tie into the pre-law waste disposal area.

Hydrology

The probable hydrologic consequences of additional refuse disposal in this area will be negligible. Quarterly monitoring of the surface water site downstream of the refuse disposal area remains unchanged, within effluent limitations, and shows no impact from the disposal operation. See attached D-8A QMR table. Groundwater monitoring wells 2001 series were evaluated after five (5) consecutive quarterly samples had been collected and analyzed. (This evaluation was submitted to ODNR in April, 2002) Averages for the 2002 evaluation, when compared averages of more current (10) quarterly samples collected, indicate the following;

In the 1st aquifer encountered: (downdip well CG-01-3C, elev. 1160.66, depth 27.2', and updip well 01-4C, elev. 1151.96, depth 25.8') pH has remained neutral, Alkalinity has increased slightly from 113 to 166, Sulfate has increased in the updip well only from 33.5 to 177.6, Specific Conductance has increased from 268 to 788, T.S.S. has remained the same, Aluminum has increased slightly from 0.10 to

Addendum to ARP, Item 4., continued:

0.77, Iron has remained the same or decreased slightly from 0.72 to 0.21, and Manganese has remained virtually the same with variations between 0.02 and 0.05. See attached QMR tables for wells CG-01-3C and 01-4C.

In the 1st significant aquifer in the #12 coal bed, (*downdip well CG-01-3B, elev. 1161.31, depth 90.3'*) pH has remained neutral, Alkalinity has decreased slightly from 250 to 218, Sulfate has increased slightly from 120 to 191, Specific Conductance has increased slightly from 742 to 802, T.S.S. has increased from 7.9 to 56.6, Aluminum has increased from 0.33 to 1.27, Iron has increased from 0.31 to 2.63, and Manganese has remained virtually the same with variations between 0.10 and 0.18. See attached QMR table for well CG-01-3B.

In the 1st continuous aquifer (*downdip well CG-01-2A, elev. 939.41, depth 25.03'*) pH has remained neutral, Alkalinity has increased slightly from 187 to 201, Sulfate has increased from 291 to 503, Specific Conductance has increased from 1130 to 1827, T.S.S. has increased only slightly from 11.9 to 16.5, Aluminum has decreased slightly from 0.15 to 0.13, Iron has decreased from 1.48 to 0.22, and Manganese has remained virtually the same with variations between 0.05 and 0.08. See attached QMR table for well CG-01-2A.

The 2006 (CG-06-01S, CG-06-01D, CG-06-02S, and CG-06-2D) series wells are located at greater distances from the existing refuse disposal area and are comparable to the 01-3 and 01-4 wells.

Ongoing monitoring of the refuse disposal at the Century mine site has not shown significant quality or quantity impacts to groundwater and no changes in surface water quality or quantity. Some impacts to ground water quality in the form of increases in sulfate, total dissolved solids as indicated by specific conductance, and also iron have been noted in quarterly monitoring data. The refuse disposal proposed by this ARP should have no additional impact on the hydrologic balance.

**Addendum to ARP Item 4
Quarterly Monitoring Table**

Site	D-8A											
Date	5-15-07	8-15-07	11-26-07	2-13-08	5-8-08	8-8-08	11-20-08	2-13-09	5-27-09	9-30-09	11-12-09	
pH	8.32	8.14	8.06	6.40	8.26	8.20	7.89	7.70	8.04	8.11	7.47	
Acidity	0.00	1.18	3.13	4.41	4.09	1.29	3.81	21.60	6.24	9.33	2.53	
Alkalinity	149.98	175.73	144.16	47.92	144.29	202.24	142.44	560.51	134.83	584.79	124.83	
Iron	0.07	1.28	0.20	0.55	0.20	0.03	0.03	72.26	0.06	69.30	<0.003	
Manganese	<0.02	0.05	0.03	0.04	0.04	<0.02	<0.02	3.08	0.03	2.67	<0.03	
Aluminum	0.04	0.05	0.21	0.64	0.14	0.04	0.05	17.09	0.13	1.45	0.13	
T.S.S.	1.00	22.00	2.00	12.00	5.00	1.00	1.00	1532.00	9.00	192.00	2.00	
Hardness	150.00	177.00	108.00	70.00	120.00	220.00	123.00	1078.00	117.00	943.00	118.00	
Sulfates	61.00	193.00	42.00	24.00	52.00	416.00	40.00	3071.00	112.00	3106.00	31.00	
Spec. Cond.	441	786	385	172	389	2090	384	8650	738	9840	348	
Flow Rate	6.00 cfs	4.40 cfs	3.20 cfs	7.50cfs	3.00cfs	1.20 cfs	0.96 cfs	0.88 cfs	0.80 cfs	1.05 cfs	1.2 cfs	

The high value ranges shown for the 2-13-09 and 9-30-09 quarterly samples were caused by careless sample collection. Debris from the stream bottom contaminated the samples.

**Addendum to ARP Item 4
Quarterly Monitoring Table**

Site	CG-01-2A										
	Date	2-28-07	5-9-07	9-25-07	12-19-07	3-20-08	5-7-08	8-28-08	11-12-08	3-27-09	5-14-09
pH		7.30	6.96	7.32	6.89	7.49	7.47	7.81	7.32	7.12	7.78
Alkalinity		200.00	200.00	210.00	180.00	220.00	150.00	210.00	210.00	220.00	210.00
Iron		0.20	0.22	0.35	0.20	0.16	0.16	0.22	0.16	0.20	0.30
Manganese		0.065	0.027	0.068	0.094	0.14	0.095	0.12	<0.10	0.07	0.07
Aluminum		0.16	0.18	0.25	0.19	<0.04	<0.04	0.17	<0.05	<0.10	<0.10
T.S.S.		<1.00	6.00	<1.00	7.00	<1.00	4.00	<10.00	<10.00	<10.00	130.00
Sulfates		550.00	360.00	380.00	590.00	600.00	640.00	480.00	120.00	670.00	640.00
Spec. Cond.		1800	1600	1800	1900	2000	2000	1920	1590	1840	1820

**Addendum to ARP Item 4
Quarterly Monitoring Table**

Site	CG-01-3B										
Date	2-28-07	5-9-07	9-25-07	12-19-07	3-20-08	5-7-08	8-28-08	11-12-08	3-27-09	5-14-09	
pH	6.96	6.80	6.81	6.61	6.79	7.02	7.44	6.84	6.75	7.45	
Alkalinity	250.00	240.00	220.00	210.00	210.00	210.00	190.00	210.00	210.00	230.00	
Iron	16.00	5.90	3.50	2.20	1.60	2.30	2.70	--	1.30	1.50	
Manganese	0.40	0.29	0.22	0.13	0.19	0.065	0.11	--	0.07	0.13	
Aluminum	12.00	4.30	2.10	1.10	0.19	1.10	0.96	--	0.30	0.10	
T.S.S.	550.00	110.00	100.00	70.00	43.00	57.00	50.00	<10.00	53.00	21.00	
Sulfates	140.00	160.00	150.00	160.00	200.00	197.00	170.00	180.00	200.00	180.00	
Spec. Cond.	850.00	850.00	780.00	800.00	840.00	890.00	956.00	765.00	500.00	784.00	

**Addendum to ARP Item 4
Quarterly Monitoring Report**

Site	CG-01-3C									
Date	2-28-07	5-9-07	9-25-07	12-19-07	3-20-08	5-7-08	8-28-08	11-12-08	3-27-09	5-14-09
pH	6.77	DRY	DRY	6.82	6.87	DRY	DRY	DRY	6.79	7.50
Acidity	<1.00			5.70	4.00				9.30	<5.00
Alkalinity	120.00			160.00	120.00				220.00	210.00
Iron	0.26			0.28	0.11				0.40	0.40
Manganese	0.005			0.005	<0.002				0.02	0.05
Aluminum	--			--	--				--	--
T.S.S.	<1.00			<1.00	<1.00				<10.00	<10.00
Sulfates	24.00			15.00	10.00				58.00	42.00
Spec. Cond.	310.00			360.00	320.00				529.00	491.00

Addendum to ARP Item 4
Quarterly Monitoring Table

Site	CG-01-4C									
Date	2-28-07	5-9-07	9-25-07	12-19-07	3-20-08	5-7-08	8-28-08	11-12-08	3-27-09	5-14-09
pH	7.08	6.88	7.35	7.12	6.68	7.93	7.77	7.21	6.64	6.98
Acidity	<1.00	2.10	16.00	5.60	4.00	4.80	0.17	33.00	8.60	7.20
Alkalinity	190.00	190.00	190.00	200.00	87.00	150.00	120.00	220.00	150.00	120.00
Iron	0.03	0.96	0.06	0.04	0.47	0.05	0.19	<0.10	0.10	<0.10
Manganese	<0.002	0.015	0.098	<0.002	0.017	0.018	<0.004	<0.01	<0.02	<0.02
Aluminum	--	--	--	--	--	--	--	--	--	--
T.S.S.	<1.00	<1.00	<1.00	<1.00	<1.00	2.00	<10.00	<6.70	<10.00	<10.00
Sulfates	110.00	96.00	100.00	200.00	290.00	150.00	100.00	420.00	180.00	130.00
Spec. Cond.	710.00	680.00	670.00	970.00	900.00	770.00	675.00	1260.00	701.00	540.00

Addendum to ARP, Item 4., American Energy Corp.



COAL MINING AND RECLAMATION PERMIT APPLICATION TO REVISE A PERMIT (ARP)

Issued To: AMERICAN ENERGY CORP
43521 Mayhugh Hill Rd.
Twp Hwy 88
Beallsville, OH 43716

Permit Number: D-425
Application Number R-425-19

Telephone: (740) 926-9152

Effective: 10/03/2007

Expires: 10/21/2009

ARP Type:

Quarterly Monitoring Sites (QMR) - Addition

Quarterly Monitoring Sites (QMR) - Deletion

The issuance of this ARP means only that the application to conduct a coal mining operation meets the requirements of Chapter 1513 of the Revised Code, and as such DOES NOT RELIEVE the operator of any obligation to meet other federal, state or local requirements.

This ARP is issued in accordance with and subject to the provisions, conditions, and limitations of Chapter 1513 of the Revised Code and Chapters 1501:13-1, 1501:13-3 through 1501:13-14 of the Administrative Code.

The approved water monitoring plan for this ARP is:

Quality: N/A

Quantity: N/A

Note: Any previous condition(s) imposed on this permit, or subsequent adjacent areas, also apply to this ARP unless noted otherwise.

Signature:

Chief, Mineral Resources Management

Date: 10/03/2007

✓
New Submittal
Revised Submittal R- 425-19

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINERAL RESOURCES MANAGEMENT

APPLICATION TO REVISE A COAL MINING PERMIT

Note: Refer to the division's "General Guidelines for Processing ARPs" and "Requirements for Specific Types of Common ARPs" for guidance on submitting and processing ARPs.

1. Applicant's Name **American Energy Corporation**
Address **43521 Mayhugh Hill Road**
City **Beallsville** State **Ohio** Zip **43716**
Telephone Number **740-926-9152**
2. Permit Number **D-0425**
3. Section of mining and reclamation to be revised:
Part 3, F(3)
4. Describe in detail the proposed revision and submit any necessary drawings, plans, maps, etc:

Monitoring wells CG-01-5A, CG-01-5B, and CG-01-5C are being abandoned.
5. Describe in detail the reason for requesting the revision:

The above referenced monitoring wells are being properly abandoned to allow for additional refuse disposal. New monitoring wells, CG-06-01-S and CG-06-01D, have been installed approximately 1475 feet southeast, at comparable surface elevations, to replace the above referenced wells to be abandoned.
6. Will this revision constitute a significant alteration from the mining and reclamation operations contemplated in the original permit? ☐ Yes, ☒ No.
(Note: refer to paragraph (E)(2) of 1501:13-04-06 of the Ohio Administrative Code to determine if a revision is deemed significant.)

If "yes," complete the following items 7 through 9.
7. In the space below, give the name and address of the newspaper in which the public notice is to be published.
8. In the space below, give the text of the public notice that is to be published. (Include the information required by paragraph (A)(1) of 1501:13-05-01 of the Ohio Administrative Code.)

Revised 03/06
DNR-744-9003

OPERATOR

AEC 09213

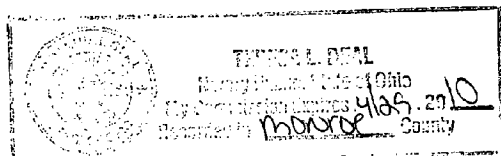
9. In the space below, give the name and address of the public office where this application is to be filed for public viewing.

I, the undersigned, a responsible official of the applicant, do hereby verify the information contained in this revision request is true and correct to the best of my information and belief.

Print Name Ryan M. Murray Title GENERAL MANAGER

Signature Ry M. Murray Date 02/05/07

Sworn before me and subscribed in my presence this 5th day of February, 2007



Thomas L. Deal
Notary Public

(For Division Use Only)

This application for renewal is hereby ☒ issued, ☐ disapproved.

Scott R. Kell 10-3-07
Chief, Division of Mineral Resources Management Date

WILLIAM J. SIPLIVY, P.E., C.P.G.

Geotechnical Engineer

30 October 2007

Mr. Fred Blumling
American Energy Corporation
43521 Mayhugh Hill Road
Beallsville, Ohio 43716

Re: De-commissioned Groundwater Monitoring Wells

Dear Fred:

Groundwater monitoring wells CG-01-5A, CG-01-5B, and CG-01-5C were de-commissioned on 30 October 2007. The work was performed in my presence by Larry Conway and crew from Bennoc, Inc., Morristown, Ohio. The equipment used was a rubber tire backhoe.

The procedure included: (1) Removal of each protective steel casing, (2) Excavating each well to a depth of four feet, minimum, below the ground surface, (3) Cutting off the pvc riser at the four-foot depth level, and grouting each well full with Type 1 Portland cement, and (4) backfilling each well excavation with four feet of compacted clay.

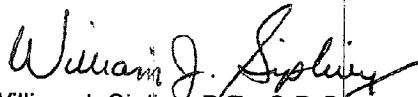
All wells are located in the northwest corner of Section 3, Wayne Township, Belmont County, Ohio. Attached are schematics of each well's construction and surveyed location (State Plane Coordinates, 1927).

The monitor wells were de-commissioned in compliance with OAC 3745-9-10.

Please let me know if there are any questions.

Respectfully submitted,

William J. Siplivy, P.E., Inc.


William J. Siplivy, P.E., C.P.G.
President

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-5A

Collar Elevation (feet, msl): 1161.07
Location: N 695,518.10 E 2,412,308.91
Date Started: 12 March 2001
Date Completed: 20 March 2001
Water Depth: 203.12 feet
Water Elevation: 957.95 feet, msl

Well Materials List

1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 56 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 4 bags
11. Installation method: Gravity

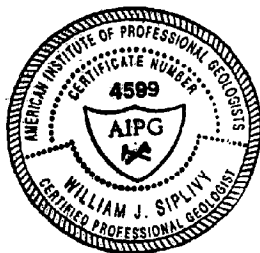
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy w/rain, high 30's
5. Supervision: William J. Siplivy

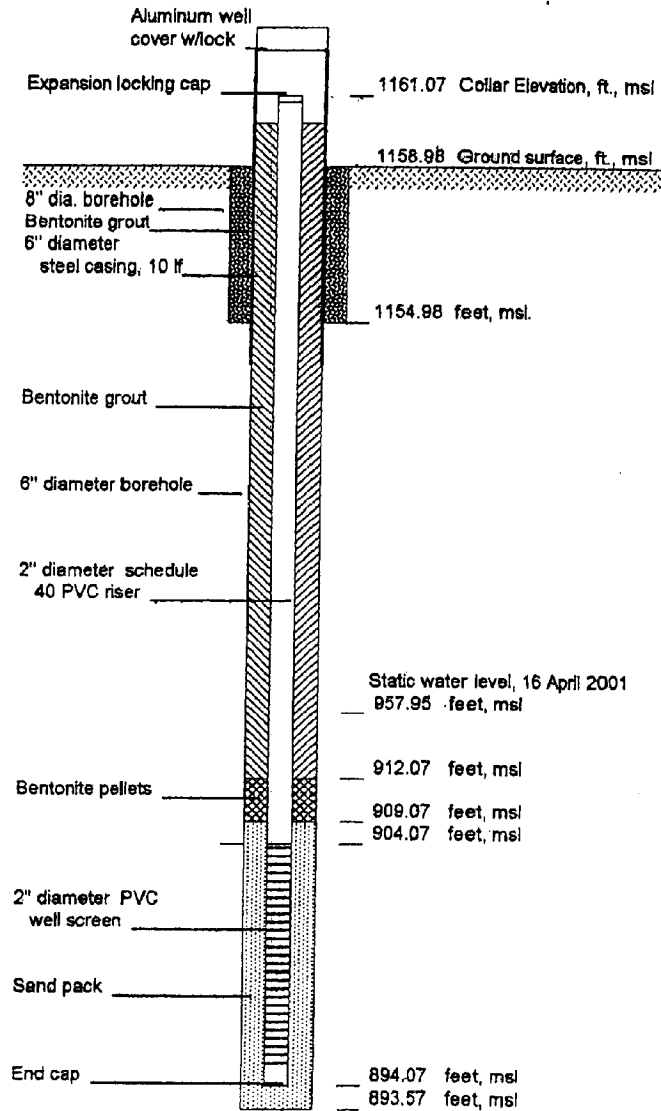
Respectfully submitted,

William J. Siplivy

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG



CG-01-5A.WK4



OPERATOR

WJS

AEC 09216

MONITOR WELL INSTALLATION LOG

**HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO**

Well No.: CG-01-5B

Collar Elevation (feet, msl): 1160.16
Location: N.695,537.87 E 2,412,307.73
Date Started: 20 March 2001
Date Completed: 20 March 2001
Water Depth: 77.06 feet
Water Elevation: 1083.1 feet, msl

Well Materials List

1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 14 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

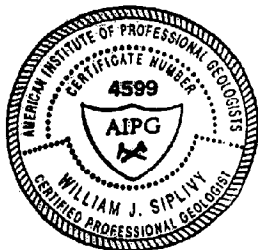
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

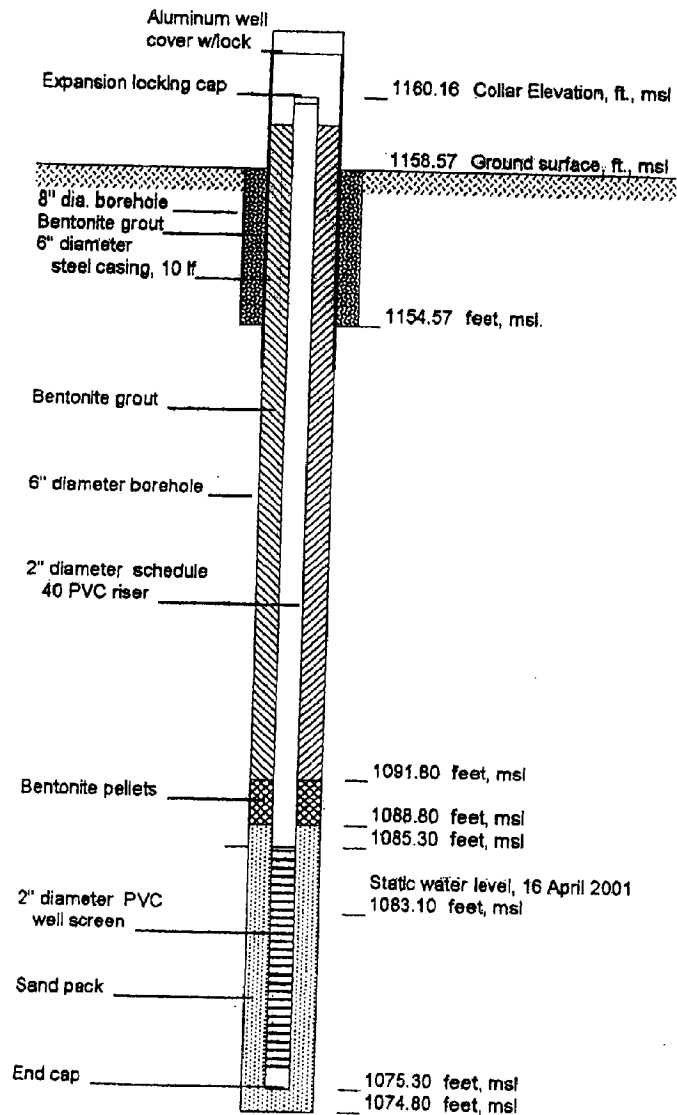
Respectfully submitted,

William J. Siplivy

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG



CG-01-5B:WK4



WJS

AEC 09217

MONITOR WELL INSTALLATION LOG

**HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO**

Well No.: CG-01-5C

Collar Elevation (feet, msl): 1160.86
Location: N 695,528.14 E 2,412,308.76
Date Started: 20 March 2001
Date Completed: 20 March 2001
Water Depth: 7.24 feet
Water Elevation: 1153.62 feet, msl

Well Materials List

1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 2 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 5 bags
11. Installation method: Gravity

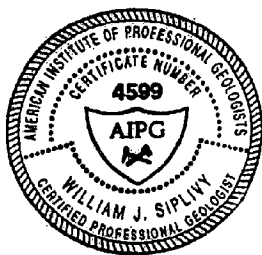
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

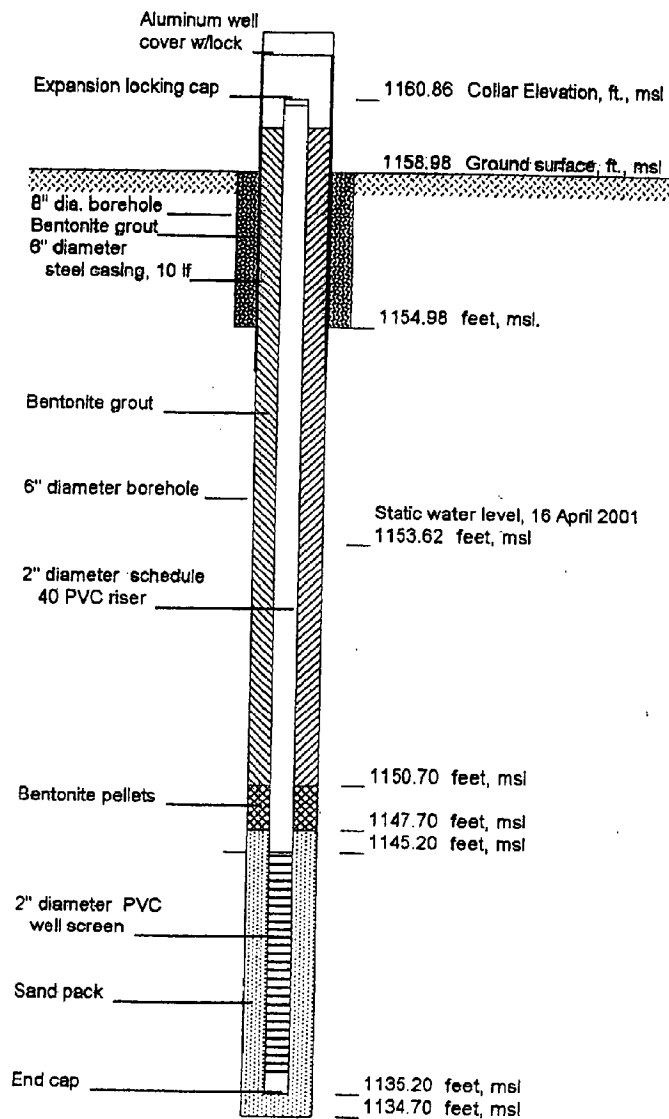
Respectfully submitted,

William J. Siplivy

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG



CG-01-5C.WK4



WJS

AEC 09218

MONITOR WELL INSTALLATION LOG

OWNER: AMERICAN ENERGY CORPORATION
 PROJECT: HYDROGEOLOGIC INVESTIGATION - No. 2 COARSE COAL REFUSE DISPOSAL AREA
 LOCATION: SECTION 3, WAYNE TOWNSHIP, BELMONT COUNTY, OHIO

Well No.: CG-06-1S

Collar Elevation (feet, msl): 1161.49
 Location: N 694,168.20 E 2,412,882.12
 Date Started: 20 July 2006
 Date Completed: 20 July 2006
 Well Depth * (feet): 88.00
 Groundwater Depth * (feet): 82.93
 Water Elevation (feet, msl): 1078.56

Well Materials List

1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 16 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

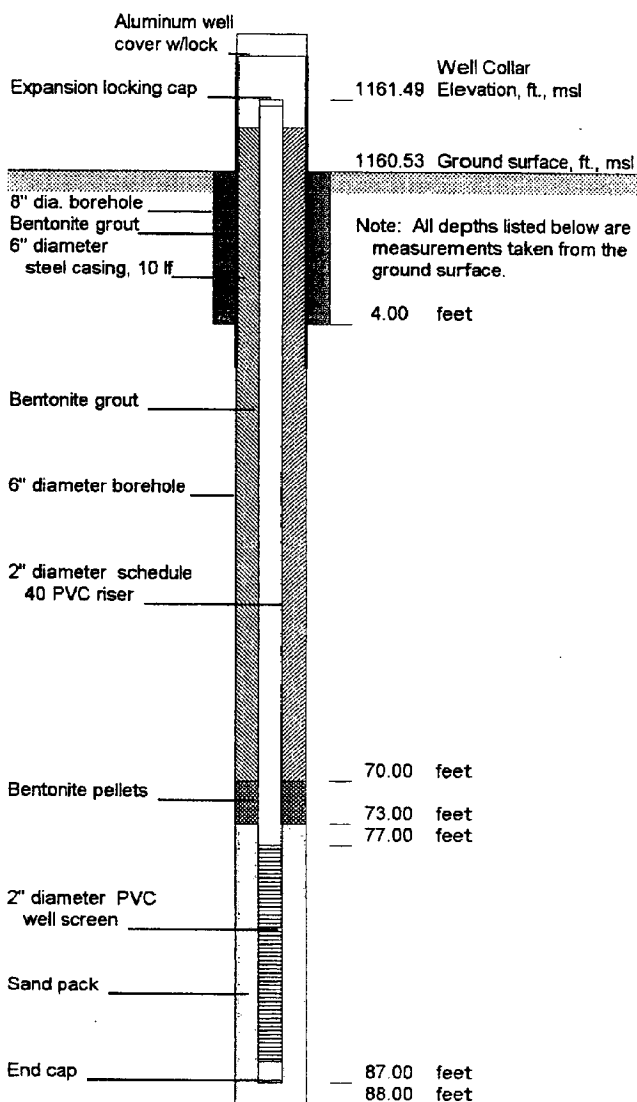
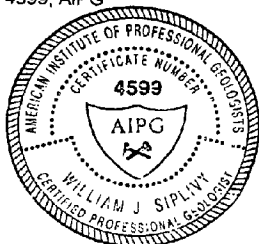
Drilling

1. Contractor: McKay & Gould Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Sunny, mid 80's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy

William J. Siplivy
 Certified Professional Geologist
 No. 4599, AIPG



Note: (*) Well depth and depth to groundwater measured from well collar (top of 2" PVC riser pipe).
 Static groundwater level measured on 7 August 2006.

AEC 09219

MONITOR WELL INSTALLATION LOG

OWNER: AMERICAN ENERGY CORPORATION
 PROJECT: HYDROGEOLOGIC INVESTIGATION - No. 2 COARSE COAL REFUSE DISPOSAL AREA
 LOCATION: SECTION 3, WAYNE TOWNSHIP, BELMONT COUNTY, OHIO

Well No.: CG-06-1D

Collar Elevation (feet, msl): 1160.80
 Location: N 694,163.63 E 2,412,892.27
 Date Started: 19 July 2006
 Date Completed: 20 July 2006
 Well Depth * (feet): 137.00
 Groundwater Depth * (feet): 127.00
 Water Elevation (feet, msl): 1033.80

Well Materials List

1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 26 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

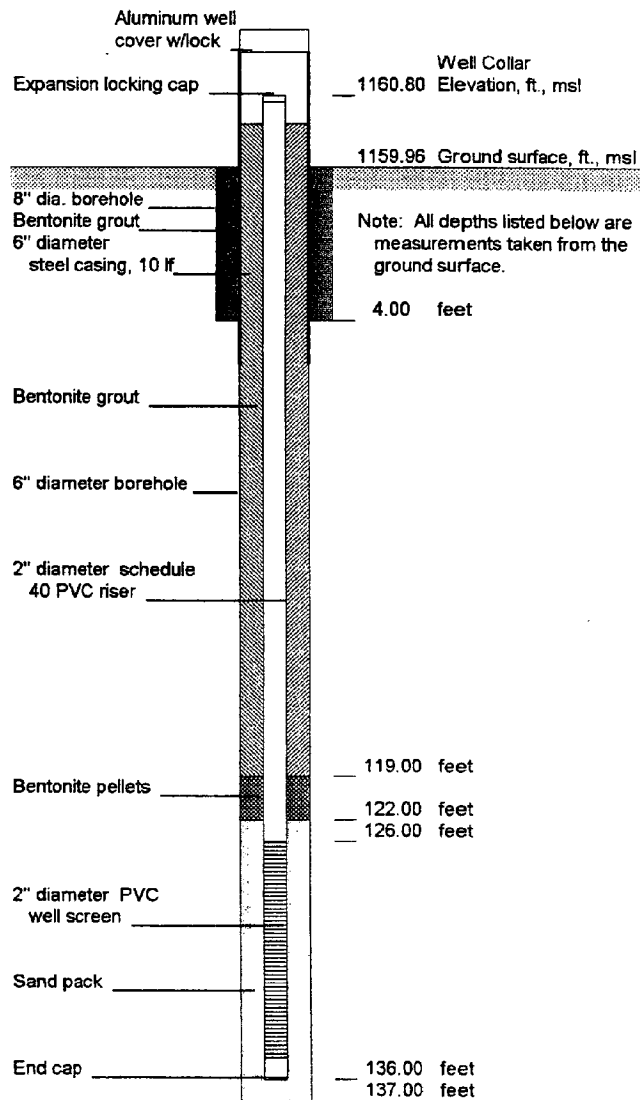
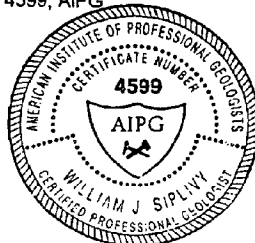
Drilling

1. Contractor: McKay & Gould Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Sunny, mid 80's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy

William J. Siplivy
 Certified Professional Geologist
 No. 4599, AIPG



Note: (*) Well depth and depth to groundwater measured from well collar (top of 2" PVC riser pipe).
 Static groundwater level measured on 7 August 2006.

AEC 09220

Addendum to ARP, Item 4., Part 3, A(5)(a), Impoundment Modifications Description

Pond 012: The original sediment storage volume of 2.2 ac-ft will be increased to 2.57 ac-ft by extending the northern portion of the pond while maintaining the top of dam and bottom of pond elevations. No modifications were required to the spillway.

Pond 013: The Principal Spillway on this structure has been changed from a 14 inch HDPE pipe w/ 18 inch riser to a 15 inch HDPE pipe w/ 18 inch riser.

Pond 014: The original sediment storage volume of 12.9 ac-ft will be decreased to 10.31 ac-ft by means of raising the top of dam from an elevation of 1172.0' to an elevation of 1174.75' while maintaining the bottom of pond elevation at 1160.0'. The spillway has been modified to pass the 10Y 24H and 25Y 24H storm events.

Pond 015: The original sediment storage volume of 1.0 ac-ft will be increased to 1.58 ac-ft by means of raising the top of dam from an elevation of 1151.6' to an elevation of 1153.0' while maintaining the bottom of pond elevation at 1142.0'. The spillway has been modified to pass the 10Y 24H and the 25Y 24H storm events.

All ponds have been designed to pass the 10 Year 24 Hour and the 25 Year 24 Hour Storm Events.

See attached Pond/Impoundment Plans for detailed information.

**OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINERAL RESOURCES MANAGEMENT**

POND/IMPOUNDMENT PLAN

Applicant's Name **American Energy Corporation** Pond/Impoundment # **012 Modified**

Type of pond/impoundment **Excavated** Permanent ☐ Temporary ☒

1. DRAINAGE AREA DATA:

- a) Drainage area **14.77** acres
- b) Disturbed area **7.7** acres
- c) Ave. land slope **20** %
- d) Hydrologic soil group **C**
- e) Hydraulic length **1645** ft.
- f) Cover/condition of the undisturbed area **Pasture/Fair**

2. DESIGN STORM CRITERIA:

a) Method:

- 1) Design method(s) including computer programs: **SEDCAD, Flowmaster**
- 2) NRCS curve number **86**

b)	Rainfall Amount/Peak Flow	Rainfall, in.	Peak flow, cfs.
1)	10 year, 24 hour =	3.7	23.77
2)	25 year, 24 hour =	4.2	28.30
3)	50 year, 6 hour = (if permanent)	N/A	N/A
4)	100 year, 6 hour = (if 20/20 size)	N/A	N/A

3. SIZE:

a) Dimensions:

1)	Dam height	5	ft.	4)	Dam downstream slope	42 (AVG)	%
2)	Dam width	12(Min.)	ft.	5)	Dam upstream slope	36 (AVG)	%
3)	Dam length	615	ft.	6)	Core length	N/A ft. N/A ft. N/A ft.	

b) Sediment storage volume **2.57** ac. ft. is provided below the **997** foot elevation.

c) Stage/Area Data:

	Elevation ft.	Surface Area ac.	Volume ac.ft.
1) Bottom of pond/impoundment	991	0.42	0.0
2) Streambed at upstream toe:	995	0.36	1.56
3) Principal spillway inlet:	N/A	N/A	N/A
4) Emergency spillway crest:	997	0.67	2.57
5) Top of embankment:	1000	0.80	4.78

4. PRINCIPAL SPILLWAY:

- a) Pipe length N/A ft.
- b) Pipe diameter N/A in.
- c) Pipe slope N/A %
- d) Riser diameter N/A in.
- e) Riser height N/A ft.
- f) Type of pipe N/A
- g) Number of anti-seep collars N/A; spacing along pipe N/A ft.
- h) Does the design include a trash rack? ☐ Yes, ☒ No.
- i) Does the design include an anti-vortex device? ☐ Yes, ☒ No.

5. EMERGENCY SPILLWAY/EXIT CHANNEL:

- a) Base width 12 ft.
- b) Design flow depth 1 ft.
- c) Exit slope 50%
- d) Exit velocity 5.60 fps
- e) Channel lining 18" Rock Riprap
- f) Side slopes 2:1 (Max.)
- g) Freeboard 2 ft.
- h) Entrance slope 36 %
- i) Length of level control section 20 ft.

6. The minimum static factor of safety for this impoundment is 1.5

7. Provide as an addendum to this attachment a detailed plan view or 2 cross sections of the impoundment.

8. COMMENTS:

9. Is this an MSHA structure? ☐ Yes ☒ No. If "yes," provide the MSHA ID number if one has been assigned

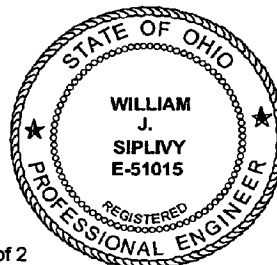
10. If this is to be retained as a permanent impoundment, submit an addendum to this attachment demonstrating compliance with 1501:13-9-04 of the Administrative Code.

11. I hereby certify that this impoundment is designed to comply with the applicable requirements of 1501:13-9-04 of the Administrative Code using current, prudent engineering practices.

William J. Siplivy
Signature

16 APRIL 2010
Date

P.E. SEAL



Part 3: Section A/H

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINERAL RESOURCES MANAGEMENT

POND/IMPOUNDMENT PLAN

Applicant's Name **American Energy Corporation** Pond/Impoundment # **013 Modified**

Type of pond/impoundment **Embankment** Permanent ☐ Temporary ☒

1. DRAINAGE AREA DATA:

- a) Drainage area **49.8** acres
- b) Disturbed area **40.4** acres
- c) Ave. land slope **25** %
- d) Hydrologic soil group **C**
- e) Hydraulic length **5144** ft.
- f) Cover/condition of the undisturbed area **Pasture/Fair**

2. DESIGN STORM CRITERIA:

a) Method:

- 1) Design method(s) including computer programs: **SEDCAD 4.0**
- 2) NRCS curve number **various (see run sheets)**

b) Rainfall Amount/Peak Flow Rainfall, in. Peak flow, cfs.

- 1) 10 year, 24 hour = **3.7** **66.91**
- 2) 25 year, 24 hour = **4.2** **80.09**
- 3) 50 year, 6 hour =
(if permanent)
- 4) 100 year, 6 hour =
(if 20/20 size)

3. SIZE:

a) Dimensions:

- | | | | | | |
|---------------|------------|-----|-------------------------|----------------|-----|
| 1) Dam height | 18 | ft. | 4) Dam downstream slope | 50 | % |
| 2) Dam width | 12 | ft. | 5) Dam upstream slope | 33 1/3 | % |
| 3) Dam length | 900 | ft. | 6) Core length | N/A ft. | ft. |

b) Sediment storage volume **8.3** ac. ft. is provided below the **1117** foot elevation.

c) Stage/Area Data:

	Elevation ft.	Surface Area ac.	Volume ft.
1) Bottom of pond/impoundment	1100	0.02	0.0
2) Streambed at upstream toe:	1100	0.02	0.0
3) Principal spillway inlet:	1117*	1.17	8.3
4) Emergency spillway crest:	1120	1.37	12.15
5) Top of embankment:	1121.5	1.47	14.28

4. PRINCIPAL SPILLWAY:

- a) Pipe length **66** ft.
- b) Pipe diameter **15** in.
- c) Pipe slope **2.9** %
- d) Riser diameter **18** in.
- e) Riser height **10** ft.
- f) Type of pipe **HDPE**
- g) Number of anti-seep collars **2**; spacing along pipe **20** ft.
- h) Does the design include a trash rack? ☐ Yes, ☒ No.
- i) Does the design include an anti-vortex device? ☐ Yes, ☒ No.

5. EMERGENCY SPILLWAY/EXIT CHANNEL:

- a) Base width **12** ft.
- b) Design flow depth **0.2** ft.
- c) Exit slope **0.0**%
- d) Exist velocity **2.7** fps
- e) Channel lining **Grass Mix**
- f) Side slopes **2:1**
- g) Freeboard **1.5** ft.
- h) Entrance slope **50** %
- i) Length of level control section **20** ft.

6. The minimum static factor of safety for this impoundment is **1.5**

7. Provide as an addendum to this attachment a detailed plan view or 2 cross sections of the impoundment.

8. COMMENTS:

*** Riser pipe shall have four (4), 4" holes placed at elevation 1114.5'. Storage below perforations is 5.6 acre-feet.**

9. Is this an MSHA structure? ☐ Yes ☒ No. If "yes," provide the MSHA ID number if one has been assigned

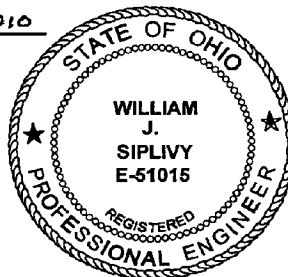
10. If this is to be retained as a permanent impoundment, submit an addendum to this attachment demonstrating compliance with 1501:13-9-04 of the Administrative Code.

11. I hereby certify that this impoundment is designed to comply with the applicable requirements of 1501:13-9-04 of the Administrative Code using current, prudent engineering practices.

William J. Siplivy
Signature

16 APRIL 2010
Date

P. E. SEAL



Part 3: Section A/H

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINERAL RESOURCES MANAGEMENT

POND/IMPOUNDMENT PLAN

Applicant's Name **American Energy Corporation** Pond/Impoundment # **014**

Type of pond/impoundment **Embankment** Permanent ☐ Temporary ☒

1. DRAINAGE AREA DATA:

- a) Drainage area **68.01** acres
- b) Disturbed area **68.01** acres
- c) Ave. land slope **18.54** %
- d) Hydrologic soil group **C**
- e) Hydraulic length **944.00** ft.
- f) Cover/condition of the undisturbed area **N/A**

2. DESIGN STORM CRITERIA:

a) Method:

1) Design method(s) including computer programs: **SEDCAD, Flowmaster**

2) NRCS curve number **86**

b) Rainfall Amount/Peak Flow Rainfall, in. Peak flow, cfs.

- 1) 10 year, 24 hour = **3.7** **155.13**
- 2) 25 year, 24 hour = **4.2** **182.68**
- 3) 50 year, 6 hour = **N/A** **N/A**
(if permanent)
- 4) 100 year, 6 hour = **N/A** **N/A**
(if 20/20 size)

3. SIZE:

a) Dimensions:

- | | | | | | |
|---------------|--------------|-----|-------------------------|------------------------------|---|
| 1) Dam height | 11.64 | ft. | 4) Dam downstream slope | 50 | % |
| 2) Dam width | 15 | ft. | 5) Dam upstream slope | 50 | % |
| 3) Dam length | 1320 | ft. | 6) Core length | 5 ft. 10 ft. 1320 ft. | |

b) Sediment storage volume **10.31** ac. ft. is provided below the **1168.00** foot elevation.

c) Stage/Area Data:

	Elevation ft.	Surface Area ac.	Volume ac.ft.
1) Bottom of pond/impoundment	1160.00	1.01	0.0
2) Streambed at upstream toe:	1163.11	1.23	3.53
3) Principal spillway inlet:	1168.00	1.58	10.31
4) Emergency spillway crest:	1172.75	1.96	18.71
5) Top of embankment:	1174.75	2.12	22.79

PRINCIPAL SPILLWAY:

- a) Pipe length **80 ft.**
- b) Pipe diameter **12 in.**
- c) Pipe slope **4.5 %**
- d) Riser diameter **18 in.**
- e) Riser height **8 ft.**
- f) Type of pipe **HDPE**
- g) Number of anti-seep collars **3**; spacing along pipe **20 ft.**
- h) Does the design include a trash rack? ☒ Yes, ☐ No.
- i) Does the design include an anti-vortex device? ☒ Yes, ☐ No.

5. EMERGENCY SPILLWAY/EXIT CHANNEL:

- a) Base width **15 ft.**
- b) Design flow depth **1.25 ft.**
- c) Exit slope **avg 28.75%**
- d) Exit velocity **7.3 fps**
- e) Channel lining **12" Rock Riprap**
- f) Side slopes **2:1**
- g) Freeboard **1.5 ft.**
- h) Entrance slope **50 %**
- i) Length of level control section **10 ft.**

The minimum static factor of safety for this impoundment is **1.5**

7. Provide as an addendum to this attachment a detailed plan view or 2 cross sections of the impoundment.

8. COMMENTS:

9. Is this an MSHA structure? ☐ Yes ☒ No. If "yes," provide the MSHA ID number if one has been assigned

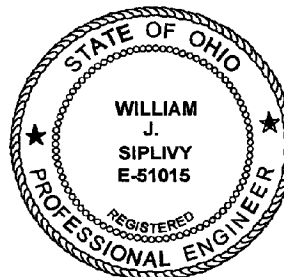
10. If this is to be retained as a permanent impoundment, submit an addendum to this attachment demonstrating compliance with 1501:13-9-04 of the Administrative Code.

11. I hereby certify that this impoundment is designed to comply with the applicable requirements of 1501:13-9-04 of the Administrative Code using current, prudent engineering practices.

William J. Siplivy
Signature

16 April 2010
Date

P.E. SEAL



Part 3: Section A/H

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINERAL RESOURCES MANAGEMENT

POND/IMPOUNDMENT PLAN

Applicant's Name **American Energy Corporation** Pond/Impoundment # **015 Modified**

Type of pond/impoundment **Excavated** Permanent ☐ Temporary ☒

1. DRAINAGE AREA DATA:

- a) Drainage area **7.68** acres
- b) Disturbed area **4.6** acres
- c) Ave. land slope **20 %**
- d) Hydrologic soil group **C**
- e) Hydraulic length **943.00** ft.
- f) Cover/condition of the undisturbed area **Pasture/Fair**

2. DESIGN STORM CRITERIA:

a) Method:

- 1) Design method(s) including computer programs: **SEDCAD, Flowmaster**
- 2) NRCS curve number **various (see run sheets)**

b)	Rainfall Amount/Peak Flow	Rainfall, in.	Peak flow, cfs.
1)	10 year, 24 hour =	3.7	17.52
2)	25 year, 24 hour =	4.2	20.63
3)	50 year, 6 hour = (if permanent)	N/A	N/A
4)	100 year, 6 hour = (if 20/20 size)	N/A	N/A

3. SIZE:

a) Dimensions:

1)	Dam height	ft.	4)	Dam downstream slope		%
2)	Dam width	ft.	5)	Dam upstream slope		%
3)	Dam length	ft.	6)	Core length	ft.	ft.

b) Sediment storage volume **1.58** ac. ft. is provided below the **1149.5** foot elevation.

c) Stage/Area Data:

	Elevation ft.	Surface Area ac.	Volume ac.ft.
1) Bottom of pond/impoundment	1142.0	0.06	0.0
2) Streambed at upstream toe:	N/A	N/A	N/A
3) Principal spillway inlet:	1149.5	0.29	1.58
4) Emergency spillway crest:	1150.5	0.31	1.88
5) Top of embankment:	1153.0	0.38	2.74

4. **PRINCIPAL SPILLWAY:**

- a) Pipe length **56.5** ft.
- b) Pipe diameter **12** in.
- c) Pipe slope **5** %
- d) Riser diameter **N/A** in.
- e) Riser height **N/A** ft.
- f) Type of pipe **HDPE**
- g) Number of anti-seep collars **2**; spacing along pipe **20** ft.
- h) Does the design include a trash rack? ☒ Yes, ☐ No.
- i) Does the design include an anti-vortex device? ☐ Yes, ☒ No.

5. **EMERGENCY SPILLWAY/EXIT CHANNEL:**

- a) Base width **12** ft.
- b) Design flow depth **0.7** ft.
- c) Exit slope **24.1** %
- d) Exit velocity **3.7** fps
- e) Channel lining **Vegetative Grass Mix**
- f) Side slopes **2:1**
- g) Freeboard **2.2** ft.
- h) Entrance slope **50** %
- i) Length of level control section **20** ft.

6. The minimum static factor of safety for this impoundment is **1.5**

7. Provide as an addendum to this attachment a detailed plan view or 2 cross sections of the impoundment.

8. **COMMENTS:**

9. Is this an MSHA structure? ☐ Yes ☒ No. If "yes," provide the MSHA ID number if one has been assigned

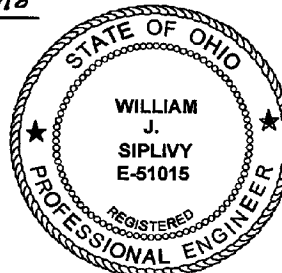
10. If this is to be retained as a permanent impoundment, submit an addendum to this attachment demonstrating compliance with 1501:13-9-04 of the Administrative Code.

11. I hereby certify that this impoundment is designed to comply with the applicable requirements of 1501:13-9-04 of the Administrative Code using current, prudent engineering practices.

William J. Siplivy
Signature

16 APRIL 2010
Date

P.E. SEAL



Part 3: Section A/H

American Energy Corporation

Expanded Coarse Coal Refuse Disposal Facility Stability Analysis Report

Addendum to Coal Waste Plan, Item 5

STABILITY ANALYSIS

General:

The proposed coal refuse fill will be a non-impounding, side-hill fill located adjacent to American Energy Corporation's Century Mine existing coarse coal refuse disposal facility located in Belmont County, Ohio. The proposed modification will expand the existing coal refuse structure to a maximum elevation of 1350.

The hill slopes vary from steep near the top of the hill to moderate to flat toward the foot. Springs and/or seeps were noted within the proposed refuse disposal area in the hydrological investigation. This drainage will be captured and diverted away from the disposal area by utilizing underdrains. A clay liner will be placed under the coal refuse to protect the groundwater and prevent leachate infiltration.

A stability analysis was performed to confirm stability of the proposed design slopes. Design slopes of 2.5H:1V, with benches, are being proposed for the disposal fill.

Soil Parameters:

Existing soil types analyzed were derived from test pits for study section. See the soils report dated November 2, 2006 for this area

Soil parameters were estimated utilizing information within the soils report and regional values. The parameters are listed in Table #1.

TABLE #1
Stability Analysis Soil Parameters

Soil Boundary	Material	Density (pcf) ¹	Cohesion (psf) ¹	Friction Angle (°) ¹
Soil #1	In-Situ	110	20	26
Soil #2	Coal Refuse	106	0	32

(pcf) = pounds per cubic foot
(psf) = pounds per square foot
(°) = degrees

Slope Configuration

The design concept for the proposed disposal fill calls for design slopes of 2.5V: 1H with a 20 - foot bench every 40 - 50 feet in height. The stability cross section was selected to be the most critical section. Seeps and springs will be drained from the area of the refuse and the entire site will be covered with a compacted low-permeable material. A leachate collection system will also be used. Even though these subdrainage measures will be employed, a slight phreatic surface was assumed in the stability analysis as a conservative approach.

Method of Analysis

The stability analysis was performed using the **GSTABLE 7** computer program. The program is capable of analyzing circular and non-circular failure surfaces. The Modified Bishop Method was used to compute factors of safety. The procedure uses an iterative approach to investigate failure surfaces until a critical surface is found.

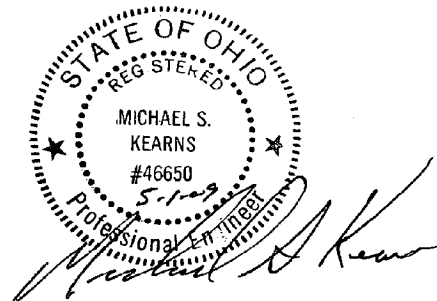
Only the circular failure surface was considered since it was found to be more critical.

Slope Stability Analysis Results

The output sheets of the **GSTABLE 7** calculations and the stability section used are attached. The static critical failure surface in the analysis had a minimum safety factor of 1.87, which is considered acceptable. Seismic Analysis was also considered in this analysis and resulted in a Factor of Safety equal to 1.44.

Conclusion:

Based on the analyses and the assumed conditions, the proposed slope should maintain long term stability and exceed the required regulatory requirements for stability.



American Energy Corporation

Expanded Coarse Coal Refuse Disposal Facility

Static Analysis

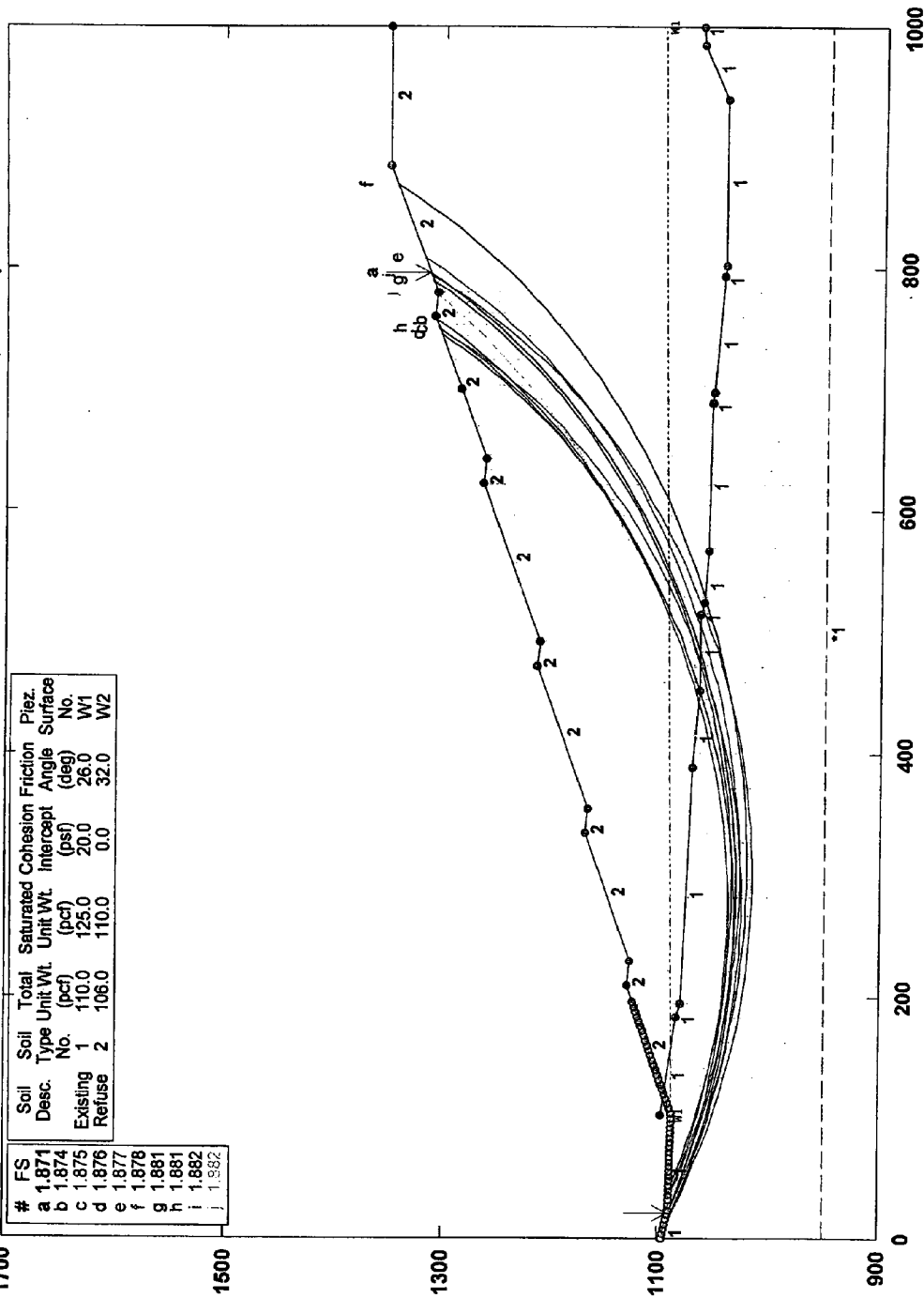
American Energy Corporation

Expanded Coarse Coal Refuse Disposal Facility

Seismic Analysis

American Energy Refuse Site Revised Expanded Refuse Site 11-21-08

z:\jobs\client\american energy corp\02001-11\engineering\proposed beltline refuse pile\stability analysis 11-21-08\refuse .pl2 Run By: Username 11/22/2008 11:49AM



GSTABL7 v.2 FSmin=1.871
Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.004, June 2003 **

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SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.

(Includes Spencer & Morgenstern-Price Type Analysis)

Including Pier/Pile, Reinforcement, Soil Nail, Tieback,

Nonlinear Undrained Shear Strength, Curved Phi Envelope,

Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water

Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

Analysis Run Date: 12/17/2007

Time of Run: 11:07AM

Run By: Michael Kearns

Input Data Filename: Z:\Jobs\Client\American Energy Corp\02001-11-1\STABILITY

ANALYSIS\aec adj 26 mks .in

Output Filename: Z:\Jobs\Client\American Energy Corp\02001-11-1\STABILITY

ANALYSIS\aec adj 26 mks .OUT

Unit System: English

Plotted Output Filename: Z:\Jobs\Client\American Energy Corp\02001-11-1\STABILITY

ANALYSIS\aec adj 26 mks .PLT

PROBLEM DESCRIPTION: American Energy Corporation

Adjacent Area Refuse Disposal Facility

BOUNDARY COORDINATES

14 Top Boundaries

27 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	1014.00	72.00	1014.00	1
2	72.00	1014.00	190.00	1061.40	2
3	190.00	1061.40	209.00	1061.00	2
4	209.00	1061.00	335.00	1111.40	2
5	335.00	1111.40	354.00	1111.00	2
6	354.00	1111.00	477.50	1160.40	2
7	477.50	1160.40	496.50	1160.00	2
8	496.50	1160.00	622.50	1210.40	2
9	622.50	1210.40	641.50	1210.00	2
10	641.50	1210.00	768.80	1260.90	2
11	768.80	1260.90	787.80	1260.50	2
12	787.80	1260.50	931.00	1317.70	2
13	931.00	1317.70	1007.00	1295.00	2
14	1007.00	1295.00	1032.00	1295.40	2
15	79.00	1014.00	123.00	1005.00	1
16	123.00	1005.00	130.00	1005.00	1
17	130.00	1005.00	197.00	1030.00	1
18	197.00	1030.00	228.00	1030.00	1
19	228.00	1030.00	344.00	1020.00	1
20	344.00	1020.00	406.00	1020.00	1
21	406.00	1020.00	487.00	1040.00	1
22	487.00	1040.00	530.00	1040.00	1
23	530.00	1040.00	633.00	1035.00	1
24	633.00	1035.00	703.00	1035.00	1
25	703.00	1035.00	831.00	1040.00	1
26	831.00	1040.00	916.00	1050.00	1
27	916.00	1050.00	1034.00	1090.00	1

User Specified Y-Origin = 900.00(ft)

User Specified X-Plus Value = 50.00(ft)

Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param. (psf)	Pressure Constant (psf)	Piez. Surface No.
1	110.0	125.0	200.0	26.0	0.00	0.0	1
2	106.0	110.0	0.0	32.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED

Unit Weight of Water = 62.40 (pcf)

Piezometric Surface No. 1 Specified by 4 Coordinate Points

Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	22.00	1014.00
2	197.00	1030.00
3	487.00	1040.00
4	1034.00	1090.00

Searching Routine Will Be Limited To An Area Defined By 1 Boundaries
Of Which The First 1 Boundaries Will Deflect Surfaces Upward

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)
1	0.00	980.00	1040.00	980.00

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.

1 Surface(s) Initiate(s) From Each Of 500 Points Equally Spaced
Along The Ground Surface Between X = 0.00(ft)
and X = 225.00(ft)

Each Surface Terminates Between X = 700.00(ft)
and X = 975.00(ft)

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 950.00(ft)

20.00(ft) Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial

Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Total Number of Trial Surfaces Attempted = 500

Number of Trial Surfaces With Valid FS = 500

Statistical Data On All Valid FS Values:

FS Max = 2.452 FS Min = 1.663 FS Ave = 1.890

Standard Deviation = 0.165 Coefficient of Variation = 8.70 %

Failure Surface Specified By 43 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	22.545	1014.000
2	41.763	1008.462
3	61.135	1003.488
4	80.643	999.082
5	100.273	995.249
6	120.005	991.990
7	139.825	989.310
8	159.714	987.210
9	179.657	985.692
10	199.635	984.757
11	219.632	984.407
12	239.630	984.641
13	259.614	985.460
14	279.564	986.862
15	299.466	988.847
16	319.300	991.412
17	339.052	994.556
18	358.703	998.275
19	378.237	1002.568
20	397.637	1007.429
21	416.887	1012.855
22	435.970	1018.842
23	454.870	1025.384
24	473.571	1032.475
25	492.056	1040.109
26	510.311	1048.281
27	528.318	1056.982
28	546.064	1066.206
29	563.533	1075.945

30	580.710	1086.190
31	597.580	1096.932
32	614.129	1108.163
33	630.342	1119.873
34	646.207	1132.052
35	661.709	1144.688
36	676.835	1157.773
37	691.572	1171.294
38	705.907	1185.240
39	719.829	1199.599
40	733.326	1214.359
41	746.385	1229.506
42	758.996	1245.029
43	771.101	1260.852

Circle Center At X = 221.618 ; Y = 1668.723 ; and Radius = 684.319

Factor of Safety

*** 1.663 ***

Slice No.	Width (ft)	Weight (lbs)	Individual data on the		62 slices		Earthquake		
			Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Force Hor (lbs)	Force Ver (lbs)	Surcharge Load (lbs)
1	19.2	6651.6	1094.9	4595.1	0.	0.	0.0	0.0	0.0
2	19.4	19431.8	3200.9	13319.7	0.	0.	0.0	0.0	0.0
3	10.9	15943.0	2718.2	10945.8	0.	0.	0.0	0.0	0.0
4	7.0	11674.7	1604.3	8315.7	0.	0.	0.0	0.0	0.0
5	1.6	3590.2	227.8	2095.9	0.	0.	0.0	0.0	0.0
6	19.6	56526.5	0.0	28701.1	0.	0.	0.0	0.0	0.0
7	19.7	81056.7	0.0	35344.6	0.	0.	0.0	0.0	0.0
8	3.0	14343.8	0.0	5879.5	0.	0.	0.0	0.0	0.0
9	7.0	35589.9	0.0	14240.5	0.	0.	0.0	0.0	0.0
10	9.8	55169.0	0.0	21162.2	0.	0.	0.0	0.0	0.0
11	19.9	130289.1	0.0	46508.9	0.	0.	0.0	0.0	0.0
12	19.9	154423.4	0.0	51020.3	0.	0.	0.0	0.0	0.0
13	10.3	88990.7	0.0	27949.8	0.	0.	0.0	0.0	0.0
14	7.0	62429.0	0.0	19437.3	0.	0.	0.0	0.0	0.0
15	2.6	23601.3	0.0	7439.4	0.	0.	0.0	0.0	0.0
16	9.4	83939.7	0.0	26622.9	0.	0.	0.0	0.0	0.0
17	10.6	97824.0	0.0	30568.1	0.	0.	0.0	0.0	0.0
18	8.4	80425.5	0.0	24252.2	0.	0.	0.0	0.0	0.0
19	11.6	116465.9	0.0	33871.4	0.	0.	0.0	0.0	0.0
20	20.0	211946.8	0.0	58326.7	0.	0.	0.0	0.0	0.0
21	20.0	225263.8	0.0	57800.6	0.	0.	0.0	0.0	0.0
22	19.9	236848.8	0.0	56545.6	0.	0.	0.0	0.0	0.0
23	19.8	246670.6	0.0	54562.6	0.	0.	0.0	0.0	0.0
24	15.7	201778.9	0.0	41466.7	0.	0.	0.0	0.0	0.0
25	4.1	52564.5	0.0	10386.9	0.	0.	0.0	0.0	0.0
26	4.9	63627.6	0.0	12549.8	0.	0.	0.0	0.0	0.0
27	10.0	126631.8	0.0	24628.1	0.	0.	0.0	0.0	0.0
28	4.7	59157.0	0.0	11242.7	0.	0.	0.0	0.0	0.0
29	19.5	249456.3	0.0	44266.5	0.	0.	0.0	0.0	0.0
30	19.4	252714.2	0.0	39395.4	0.	0.	0.0	0.0	0.0
31	8.4	110104.1	0.0	15418.6	0.	0.	0.0	0.0	0.0
32	10.9	144318.0	0.0	18392.2	0.	0.	0.0	0.0	0.0
33	19.1	255391.0	0.0	27517.8	0.	0.	0.0	0.0	0.0
34	18.9	254739.7	0.0	20521.7	0.	0.	0.0	0.0	0.0
35	18.7	252378.7	0.0	12828.6	0.	0.	0.0	0.0	0.0
36	3.9	52946.4	0.0	1675.2	0.	0.	0.0	0.0	0.0
37	9.5	125648.4	0.0	2421.0	0.	0.	0.0	0.0	0.0
38	4.8	61624.6	0.0	389.3	0.	0.	0.0	0.0	0.0
39	0.3	3362.9	0.0	7.0	0.	0.	0.0	0.0	0.0
40	1.0	12580.2	0.0	11.9	0.	0.	0.0	0.0	0.0
41	3.5	43449.6	0.0	0.0	0.	0.	0.0	0.0	0.0
42	13.8	172116.5	0.0	0.0	0.	0.	0.0	0.0	0.0
43	18.0	222369.5	0.0	0.0	0.	0.	0.0	0.0	0.0
44	17.7	215725.6	0.0	0.0	0.	0.	0.0	0.0	0.0
45	17.5	207841.8	0.0	0.0	0.	0.	0.0	0.0	0.0

46	17.2	198790.8	0.0	0.0	0.	0.	0.0	0.0	0.0
47	16.9	188651.7	0.0	0.0	0.	0.	0.0	0.0	0.0
48	16.5	177512.9	0.0	0.0	0.	0.	0.0	0.0	0.0
49	8.4	86551.1	0.0	0.0	0.	0.	0.0	0.0	0.0
50	7.8	77540.9	0.0	0.0	0.	0.	0.0	0.0	0.0
51	11.2	101667.0	0.0	0.0	0.	0.	0.0	0.0	0.0
52	4.7	40262.5	0.0	0.0	0.	0.	0.0	0.0	0.0
53	15.5	125887.1	0.0	0.0	0.	0.	0.0	0.0	0.0
54	15.1	112031.7	0.0	0.0	0.	0.	0.0	0.0	0.0
55	14.7	97697.1	0.0	0.0	0.	0.	0.0	0.0	0.0
56	14.3	82998.9	0.0	0.0	0.	0.	0.0	0.0	0.0
57	13.9	68055.9	0.0	0.0	0.	0.	0.0	0.0	0.0
58	13.5	52988.8	0.0	0.0	0.	0.	0.0	0.0	0.0
59	13.1	37921.8	0.0	0.0	0.	0.	0.0	0.0	0.0
60	12.6	22980.8	0.0	0.0	0.	0.	0.0	0.0	0.0
61	9.8	7797.6	0.0	0.0	0.	0.	0.0	0.0	0.0
62	2.3	372.7	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 41 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	34.719	1014.000
2	53.697	1007.688
3	72.875	1002.011
4	92.230	996.974
5	111.742	992.583
6	131.389	988.843
7	151.150	985.758
8	171.002	983.331
9	190.924	981.565
10	210.893	980.462
11	230.889	980.024
12	250.887	980.250
13	270.868	981.140
14	290.807	982.694
15	310.684	984.910
16	330.476	987.785
17	350.162	991.316
18	369.720	995.499
19	389.127	1000.330
20	408.364	1005.803
21	427.408	1011.913
22	446.239	1018.652
23	464.835	1026.013
24	483.176	1033.987
25	501.242	1042.567
26	519.013	1051.743
27	536.470	1061.504
28	553.592	1071.839
29	570.361	1082.738
30	586.759	1094.188
31	602.768	1106.177
32	618.369	1118.691
33	633.546	1131.717
34	648.281	1145.240
35	662.559	1159.245
36	676.364	1173.716
37	689.680	1188.639
38	702.493	1203.996
39	714.789	1219.770
40	726.553	1235.943
41	734.050	1247.006

Circle Center At X = 234.087 ; Y = 1581.789 ; and Radius = 601.774

Factor of Safety

*** 1.667 ***

Failure Surface Specified By 44 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
-----------	-------------	-------------

1	26.603	1014.000
2	45.822	1008.464
3	65.190	1003.478
4	84.694	999.049
5	104.315	995.178
6	124.040	991.869
7	143.851	989.125
8	163.732	986.948
9	183.667	985.340
10	203.640	984.302
11	223.635	983.834
12	243.634	983.939
13	263.623	984.614
14	283.584	985.860
15	303.502	987.676
16	323.359	990.060
17	343.140	993.010
18	362.829	996.525
19	382.409	1000.600
20	401.865	1005.233
21	421.181	1010.419
22	440.341	1016.156
23	459.329	1022.437
24	478.130	1029.258
25	496.728	1036.613
26	515.109	1044.497
27	533.257	1052.902
28	551.157	1061.823
29	568.796	1071.251
30	586.157	1081.179
31	603.228	1091.599
32	619.995	1102.503
33	636.443	1113.880
34	652.560	1125.724
35	668.331	1138.022
36	683.745	1150.766
37	698.789	1163.946
38	713.449	1177.549
39	727.716	1191.566
40	741.576	1205.985
41	755.018	1220.794
42	768.033	1235.980
43	780.607	1251.532
44	787.450	1260.507

Circle Center At X = 229.989 ; Y = 1683.682 ; and Radius = 699.885

Factor of Safety

*** 1.669 ***

Failure Surface Specified By 42 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	36.974	1014.000
2	56.079	1008.085
3	75.363	1002.781
4	94.806	998.094
5	114.388	994.028
6	134.090	990.588
7	153.892	987.777
8	173.773	985.598
9	193.713	984.053
10	213.692	983.143
11	233.690	982.870
12	253.687	983.235
13	273.662	984.235
14	293.595	985.872
15	313.466	988.142
16	333.254	991.043
17	352.940	994.573

18	372.504	998.729
19	391.925	1003.505
20	411.185	1008.897
21	430.263	1014.899
22	449.140	1021.506
23	467.797	1028.711
24	486.215	1036.506
25	504.376	1044.883
26	522.261	1053.835
27	539.852	1063.351
28	557.131	1073.423
29	574.080	1084.040
30	590.683	1095.191
31	606.922	1106.865
32	622.782	1119.050
33	638.245	1131.734
34	653.297	1144.904
35	667.921	1158.547
36	682.104	1172.648
37	695.831	1187.194
38	709.088	1202.170
39	721.861	1217.559
40	734.137	1233.348
41	745.905	1249.520
42	747.983	1252.577

Circle Center At X = 232.255 ; Y = 1610.789 ; and Radius = 627.927

Factor of Safety

*** 1.669 ***

Failure Surface Specified By 40 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	28.858	1014.000
2	47.919	1007.946
3	67.170	1002.524
4	86.590	997.741
5	106.157	993.601
6	125.850	990.109
7	145.647	987.270
8	165.528	985.086
9	185.469	983.559
10	205.450	982.691
11	225.449	982.483
12	245.444	982.936
13	265.413	984.048
14	285.335	985.819
15	305.187	988.247
16	324.948	991.329
17	344.596	995.061
18	364.111	999.440
19	383.471	1004.461
20	402.654	1010.119
21	421.640	1016.406
22	440.408	1023.317
23	458.938	1030.843
24	477.209	1038.977
25	495.202	1047.710
26	512.896	1057.032
27	530.273	1066.933
28	547.314	1077.403
29	564.000	1088.429
30	580.313	1100.000
31	596.235	1112.103
32	611.749	1124.726
33	626.838	1137.853
34	641.485	1151.472
35	655.674	1165.566
36	669.391	1180.122

37 682.620 1195.122
 38 695.346 1210.551
 39 707.556 1226.391
 40 717.677 1240.459
 Circle Center At X = 221.738 ; Y = 1588.136 ; and Radius = 605.669
 Factor of Safety
 *** 1.671 ***

Failure Surface Specified By 43 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	37.425	1014.000
2	56.634	1008.433
3	76.002	1003.444
4	95.511	999.039
5	115.143	995.220
6	134.881	991.992
7	154.707	989.358
8	174.602	987.319
9	194.550	985.878
10	214.533	985.036
11	234.531	984.794
12	254.528	985.151
13	274.505	986.108
14	294.445	987.664
15	314.328	989.817
16	334.139	992.565
17	353.858	995.906
18	373.467	999.837
19	392.950	1004.355
20	412.289	1009.455
21	431.467	1015.132
22	450.465	1021.382
23	469.267	1028.199
24	487.857	1035.577
25	506.216	1043.510
26	524.330	1051.989
27	542.181	1061.007
28	559.754	1070.557
29	577.032	1080.630
30	594.000	1091.217
31	610.644	1102.307
32	626.947	1113.892
33	642.895	1125.960
34	658.475	1138.501
35	673.671	1151.504
36	688.470	1164.957
37	702.860	1178.848
38	716.826	1193.164
39	730.356	1207.892
40	743.439	1223.020
41	756.062	1238.533
42	768.214	1254.417
43	772.812	1260.816

Circle Center At X = 232.615 ; Y = 1651.573 ; and Radius = 666.783
 Factor of Safety
 *** 1.671 ***

Failure Surface Specified By 44 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	32.916	1014.000
2	52.136	1008.470
3	71.509	1003.499
4	91.017	999.091
5	110.644	995.249
6	130.375	991.977
7	150.192	989.278
8	170.079	987.153

9	190.018	985.604
10	209.995	984.634
11	229.991	984.242
12	249.990	984.429
13	269.976	985.195
14	289.930	986.539
15	309.838	988.460
16	329.681	990.956
17	349.444	994.026
18	369.110	997.667
19	388.663	1001.875
20	408.085	1006.647
21	427.361	1011.980
22	446.474	1017.868
23	465.410	1024.307
24	484.150	1031.292
25	502.681	1038.815
26	520.986	1046.873
27	539.051	1055.456
28	556.859	1064.559
29	574.397	1074.174
30	591.648	1084.292
31	608.600	1094.905
32	625.237	1106.005
33	641.547	1117.581
34	657.514	1129.625
35	673.126	1142.125
36	688.369	1155.073
37	703.232	1168.456
38	717.700	1182.264
39	731.763	1196.484
40	745.409	1211.106
41	758.626	1226.117
42	771.402	1241.504
43	783.728	1257.254
44	786.146	1260.535

Circle Center At X = 233.531 ; Y = 1674.995 ; and Radius = 690.768

Factor of Safety

*** 1.671 ***

Failure Surface Specified By 40 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	43.737	1014.000
2	62.668	1007.547
3	81.812	1001.760
4	101.147	996.645
5	120.649	992.208
6	140.294	988.456
7	160.058	985.392
8	179.917	983.021
9	199.846	981.344
10	219.822	980.365
11	239.820	980.085
12	259.816	980.503
13	279.785	981.620
14	299.702	983.433
15	319.544	985.941
16	339.287	989.141
17	358.905	993.029
18	378.376	997.599
19	397.675	1002.847
20	416.779	1008.766
21	435.665	1015.349
22	454.309	1022.588
23	472.689	1030.473
24	490.782	1038.996
25	508.566	1048.146

26	526.020	1057.911
27	543.122	1068.280
28	559.852	1079.240
29	576.188	1090.779
30	592.111	1102.880
31	607.602	1115.531
32	622.641	1128.715
33	637.211	1142.416
34	651.293	1156.618
35	664.870	1171.304
36	677.926	1186.454
37	690.444	1202.052
38	702.410	1218.077
39	713.809	1234.511
40	717.620	1240.436

Circle Center At X = 237.847 ; Y = 1552.290 ; and Radius = 572.219

Factor of Safety

*** 1.673 ***

Failure Surface Specified By 43 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	45.090	1014.000
2	64.153	1007.948
3	83.396	1002.498
4	102.801	997.656
5	122.348	993.425
6	142.019	989.810
7	161.793	986.816
8	181.652	984.443
9	201.576	982.696
10	221.544	981.576
11	241.538	981.083
12	261.538	981.218
13	281.523	981.982
14	301.474	983.373
15	321.372	985.391
16	341.197	988.032
17	360.929	991.295
18	380.549	995.176
19	400.037	999.671
20	419.375	1004.777
21	438.542	1010.487
22	457.521	1016.797
23	476.292	1023.699
24	494.837	1031.188
25	513.138	1039.256
26	531.176	1047.895
27	548.933	1057.096
28	566.393	1066.850
29	583.538	1077.148
30	600.352	1087.980
31	616.816	1099.334
32	632.916	1111.200
33	648.635	1123.566
34	663.957	1136.419
35	678.869	1149.748
36	693.354	1163.538
37	707.399	1177.777
38	720.990	1192.449
39	734.114	1207.542
40	746.756	1223.039
41	758.906	1238.926
42	770.550	1255.186
43	774.299	1260.784

Circle Center At X = 247.222 ; Y = 1617.656 ; and Radius = 636.598

Factor of Safety

*** 1.675 ***

Failure Surface Specified By 41 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	45.541	1014.000
2	64.563	1007.823
3	83.782	1002.289
4	103.176	997.404
5	122.724	993.173
6	142.403	989.602
7	162.190	986.694
8	182.064	984.453
9	202.002	982.882
10	221.982	981.981
11	241.981	981.753
12	261.976	982.196
13	281.945	983.312
14	301.865	985.098
15	321.713	987.553
16	341.469	990.673
17	361.108	994.456
18	380.608	998.897
19	399.949	1003.990
20	419.107	1009.731
21	438.062	1016.113
22	456.791	1023.128
23	475.274	1030.768
24	493.490	1039.026
25	511.418	1047.891
26	529.038	1057.353
27	546.330	1067.403
28	563.274	1078.028
29	579.851	1089.217
30	596.044	1100.956
31	611.832	1113.233
32	627.199	1126.034
33	642.127	1139.344
34	656.599	1153.148
35	670.599	1167.431
36	684.110	1182.177
37	697.119	1197.368
38	709.610	1212.988
39	721.568	1229.019
40	732.981	1245.443
41	733.971	1246.974

Circle Center At X = 238.779 ; Y = 1576.691 ; and Radius = 594.947

Factor of Safety

*** 1.675 ***

**** END OF GSTABL7 OUTPUT ****

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.005, Sept. 2006 **

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SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.

(Includes Spencer & Morgenstern-Price Type Analysis)

Including Pier/File, Reinforcement, Soil Nail, Tieback,

Nonlinear Undrained Shear Strength, Curved Phi Envelope,

Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water

Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

Analysis Run Date: 11/22/2008

Time of Run: 11:49AM

Run By: Username

Input Data Filename: z:\Jobs\Client\American Energy Corp\02001-11\Engineering\Proposed

Beltline Refuse File\Stability Analysis 11-21-08\refuse .in

Output Filename: z:\Jobs\Client\American Energy

Corp\02001-11\Engineering\Proposed Beltline Refuse File\Stability Analysis 11-21-08\refuse .OUT

Unit System: English

Plotted Output Filename: z:\Jobs\Client\American Energy Corp\02001-11\Engineering\Proposed

Beltline Refuse File\Stability Analysis 11-21-08\refuse .PLT

PROBLEM DESCRIPTION: American Energy Refuse Site

Revised Expanded Refuse Site 11-21-08

BOUNDARY COORDINATES

14 Top Boundaries

28 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	1096.13	23.80	1090.00	1
2	23.80	1090.00	103.06	1087.29	1
3	103.06	1087.29	209.84	1130.00	2
4	209.84	1130.00	229.84	1128.00	2
5	229.84	1128.00	334.83	1170.00	2
6	334.83	1170.00	354.83	1168.00	2
7	354.83	1168.00	472.32	1215.00	2
8	472.32	1215.00	492.32	1213.00	2
9	492.32	1213.00	622.32	1265.00	2
10	622.32	1265.00	642.32	1263.00	2
11	642.32	1263.00	759.81	1310.00	2
12	759.81	1310.00	779.81	1308.00	2
13	779.81	1308.00	884.80	1350.00	2
14	884.80	1350.00	1000.00	1350.00	2
15	103.06	1097.29	183.53	1084.00	1
16	183.53	1084.00	194.95	1080.00	1
17	194.95	1080.00	388.92	1070.00	1
18	388.92	1070.00	452.16	1064.00	1
19	452.16	1064.00	514.76	1064.00	1
20	514.76	1064.00	524.48	1060.00	1
21	524.48	1060.00	567.50	1056.00	1
22	567.50	1056.00	689.15	1054.00	1
23	689.15	1054.00	697.47	1052.00	1
24	697.47	1052.00	794.31	1044.00	1
25	794.31	1044.00	802.08	1042.00	1
26	802.08	1042.00	939.54	1042.00	1
27	939.54	1042.00	985.35	1064.00	1
28	985.35	1064.00	1000.00	1064.42	1

User Specified Y-Origin = 900.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param. (psf)	Pressure Constant (psf)	Piez. Surface No.
1	110.0	125.0	20.0	26.0	0.00	0.0	1

2 106.0 110.0 0.0 32.0 0.00 0.0 2

1 PIEZOMETRIC SURFACE(S) SPECIFIED

Unit Weight of Water = 62.40 (pcf)

Piezometric Surface No. 1 Specified by 2 Coordinate Points

Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	103.06	1087.29
2	1000.00	1100.00

Searching Routine Will Be Limited To An Area Defined By 1 Boundaries Of Which The First 1 Boundaries Will Deflect Surfaces Upward

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)
1	0.00	950.00	1000.00	950.00

Specified Peak Ground Acceleration Coefficient (A) = 0.160(g)

Specified Horizontal Earthquake Coefficient (kh) = 0.080(g)

Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000

EARTHQUAKE DATA HAS BEEN SUPPRESSED

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

500 Trial Surfaces Have Been Generated.

1 Surface(s) Initiate(s) From Each Of 500 Points Equally Spaced Along The Ground Surface Between X = 0.00(ft)

and X = 200.00(ft)

Each Surface Terminates Between X = 700.00(ft)

and X = 1000.00(ft)

Unless Further Limitations Were Imposed, The Minimum Elevation

At Which A Surface Extends Is Y = 950.00(ft)

15.00(ft) Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial

Failure Surfaces Evaluated. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Total Number of Trial Surfaces Attempted = 500

Number of Trial Surfaces With Valid FS = 500

Statistical Data On All Valid FS Values:

FS Max = 2.549 FS Min = 1.871 FS Ave = 2.125

Standard Deviation = 0.162 Coefficient of Variation = 7.61 %

Failure Surface Specified By 60 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	21.242	1090.659
2	34.808	1084.258
3	48.529	1078.197
4	62.397	1072.480
5	76.403	1067.110
6	90.538	1062.091
7	104.795	1057.427
8	119.163	1053.119
9	133.634	1049.170
10	148.199	1045.584
11	162.848	1042.362
12	177.574	1039.506
13	192.366	1037.018
14	207.216	1034.899
15	222.114	1033.152
16	237.051	1031.776
17	252.017	1030.773
18	267.004	1030.143
19	282.002	1029.888
20	297.001	1030.006
21	311.993	1030.498
22	326.968	1031.364
23	341.917	1032.603
24	356.830	1034.214
25	371.699	1036.196

26	386.513	1038.548
27	401.264	1041.269
28	415.943	1044.357
29	430.540	1047.810
30	445.047	1051.625
31	459.454	1055.801
32	473.752	1060.335
33	487.933	1065.224
34	501.988	1070.465
35	515.907	1076.054
36	529.683	1081.989
37	543.307	1088.266
38	556.770	1094.880
39	570.064	1101.828
40	583.180	1109.105
41	596.112	1116.706
42	608.849	1124.628
43	621.385	1132.865
44	633.712	1141.411
45	645.822	1150.263
46	657.708	1159.413
47	669.362	1168.857
48	680.777	1178.589
49	691.945	1188.602
50	702.861	1198.890
51	713.517	1209.447
52	723.906	1220.267
53	734.022	1231.342
54	743.859	1242.666
55	753.411	1254.232
56	762.671	1266.032
57	771.635	1278.059
58	780.295	1290.307
59	788.648	1302.766
60	796.111	1314.521

Circle Center At X = 284.757 ; Y = 1631.521 ; and Radius = 601.641

Factor of Safety

*** 1.871 ***

Individual data on the 78 slices

Slice No.	Width (ft)	Weight (lbs)	Water		Tie		Earthquake		Surcharge Load (lbs)
			Force Top (lbs)	Force Bot (lbs)	Force Norm (lbs)	Force Tan (lbs)	Force Hor (lbs)	Force Ver (lbs)	
1	2.6	77.1	0.0	0.0	0.	0.	0.0	0.0	0.0
2	11.0	3580.6	0.0	0.0	0.	0.	0.0	0.0	0.0
3	13.7	13387.6	0.0	4860.1	0.	0.	0.0	0.0	0.0
4	13.9	23060.2	0.0	10554.6	0.	0.	0.0	0.0	0.0
5	14.0	32301.9	0.0	15927.3	0.	0.	0.0	0.0	0.0
6	14.1	41072.4	0.0	20975.1	0.	0.	0.0	0.0	0.0
7	12.5	42924.9	0.0	22325.0	0.	0.	0.0	0.0	0.0
8	1.7	6546.1	0.0	3369.8	0.	0.	0.0	0.0	0.0
9	14.4	63452.9	0.0	30083.4	0.	0.	0.0	0.0	0.0
10	14.5	80128.2	0.0	34138.2	0.	0.	0.0	0.0	0.0
11	14.6	96377.7	0.0	37856.6	0.	0.	0.0	0.0	0.0
12	10.6	79863.9	0.0	29591.1	0.	0.	0.0	0.0	0.0
13	4.0	32265.0	0.0	11645.3	0.	0.	0.0	0.0	0.0
14	14.7	126947.6	0.0	44275.5	0.	0.	0.0	0.0	0.0
15	6.0	55199.3	0.0	18609.1	0.	0.	0.0	0.0	0.0
16	8.8	85697.1	0.0	28362.8	0.	0.	0.0	0.0	0.0
17	2.6	25884.3	0.0	8425.3	0.	0.	0.0	0.0	0.0
18	12.3	128190.4	0.0	40898.8	0.	0.	0.0	0.0	0.0
19	2.6	28570.4	0.0	8908.2	0.	0.	0.0	0.0	0.0
20	12.3	134771.2	0.0	42422.5	0.	0.	0.0	0.0	0.0
21	7.7	84981.3	0.0	27224.3	0.	0.	0.0	0.0	0.0
22	7.2	80684.0	0.0	25765.9	0.	0.	0.0	0.0	0.0
23	15.0	175903.5	0.0	54301.5	0.	0.	0.0	0.0	0.0
24	15.0	186969.5	0.0	55264.0	0.	0.	0.0	0.0	0.0

25	15.0	197251.6	0.0	55877.2	0.	0.	0.0	0.0	0.0
26	15.0	206722.2	0.0	56140.4	0.	0.	0.0	0.0	0.0
27	15.0	215358.1	0.0	56053.6	0.	0.	0.0	0.0	0.0
28	15.0	223139.2	0.0	55617.0	0.	0.	0.0	0.0	0.0
29	7.9	120121.7	0.0	28956.5	0.	0.	0.0	0.0	0.0
30	7.1	108594.2	0.0	25874.0	0.	0.	0.0	0.0	0.0
31	12.9	194777.3	0.0	46569.8	0.	0.	0.0	0.0	0.0
32	2.0	29900.6	0.0	7125.3	0.	0.	0.0	0.0	0.0
33	14.9	225429.7	0.0	52211.1	0.	0.	0.0	0.0	0.0
34	14.8	229704.4	0.0	50379.5	0.	0.	0.0	0.0	0.0
35	2.4	37760.8	0.0	8026.0	0.	0.	0.0	0.0	0.0
36	12.3	195256.3	0.0	40175.5	0.	0.	0.0	0.0	0.0
37	14.7	235316.1	0.0	45678.4	0.	0.	0.0	0.0	0.0
38	14.6	236717.4	0.0	42811.9	0.	0.	0.0	0.0	0.0
39	14.5	237228.9	0.0	39603.7	0.	0.	0.0	0.0	0.0
40	7.1	116835.7	0.0	18267.0	0.	0.	0.0	0.0	0.0
41	7.3	120072.5	0.0	17788.8	0.	0.	0.0	0.0	0.0
42	12.9	212335.1	0.0	29131.0	0.	0.	0.0	0.0	0.0
43	1.4	23606.5	0.0	3039.3	0.	0.	0.0	0.0	0.0
44	10.6	171833.3	0.0	21364.7	0.	0.	0.0	0.0	0.0
45	3.6	56070.6	0.0	0.0	0.	0.	0.0	0.0	0.0
46	4.4	68441.6	0.0	0.0	0.	0.	0.0	0.0	0.0
47	9.7	149893.8	0.0	0.0	0.	0.	0.0	0.0	0.0
48	13.9	215998.1	0.0	0.0	0.	0.	0.0	0.0	0.0
49	13.8	213442.2	0.0	0.0	0.	0.	0.0	0.0	0.0
50	13.6	210180.1	0.0	0.0	0.	0.	0.0	0.0	0.0
51	11.0	169098.5	0.0	0.0	0.	0.	0.0	0.0	0.0
52	2.4	37135.3	0.0	0.0	0.	0.	0.0	0.0	0.0
53	13.3	201629.3	0.0	0.0	0.	0.	0.0	0.0	0.0
54	13.1	196395.3	0.0	0.0	0.	0.	0.0	0.0	0.0
55	12.9	190561.7	0.0	0.0	0.	0.	0.0	0.0	0.0
56	12.7	184161.5	0.0	0.0	0.	0.	0.0	0.0	0.0
57	12.5	177230.5	0.0	0.0	0.	0.	0.0	0.0	0.0
58	0.9	13039.3	0.0	0.0	0.	0.	0.0	0.0	0.0
59	11.4	153326.2	0.0	0.0	0.	0.	0.0	0.0	0.0
60	8.6	108460.7	0.0	0.0	0.	0.	0.0	0.0	0.0
61	3.5	42590.0	0.0	0.0	0.	0.	0.0	0.0	0.0
62	11.9	141031.9	0.0	0.0	0.	0.	0.0	0.0	0.0
63	11.7	132612.5	0.0	0.0	0.	0.	0.0	0.0	0.0
64	11.4	123874.0	0.0	0.0	0.	0.	0.0	0.0	0.0
65	11.2	114862.8	0.0	0.0	0.	0.	0.0	0.0	0.0
66	10.9	105626.4	0.0	0.0	0.	0.	0.0	0.0	0.0
67	10.7	96212.3	0.0	0.0	0.	0.	0.0	0.0	0.0
68	10.4	86671.1	0.0	0.0	0.	0.	0.0	0.0	0.0
69	10.1	77053.1	0.0	0.0	0.	0.	0.0	0.0	0.0
70	9.8	67409.6	0.0	0.0	0.	0.	0.0	0.0	0.0
71	9.6	57793.0	0.0	0.0	0.	0.	0.0	0.0	0.0
72	6.4	34193.9	0.0	0.0	0.	0.	0.0	0.0	0.0
73	2.9	13845.1	0.0	0.0	0.	0.	0.0	0.0	0.0
74	9.0	35363.2	0.0	0.0	0.	0.	0.0	0.0	0.0
75	8.2	21291.3	0.0	0.0	0.	0.	0.0	0.0	0.0
76	0.5	932.9	0.0	0.0	0.	0.	0.0	0.0	0.0
77	8.4	11801.1	0.0	0.0	0.	0.	0.0	0.0	0.0
78	7.5	3468.8	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 58 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	18.838	1091.278
2	32.504	1085.096
3	46.326	1079.269
4	60.294	1073.801
5	74.399	1068.695
6	88.630	1063.956
7	102.980	1059.586
8	117.437	1055.589
9	131.993	1051.966
10	146.638	1048.720

11	161.361	1045.854
12	176.154	1043.370
13	191.006	1041.268
14	205.908	1039.551
15	220.848	1038.219
16	235.819	1037.274
17	250.808	1036.716
18	265.807	1036.545
19	280.806	1036.762
20	295.793	1037.367
21	310.761	1038.359
22	325.697	1039.736
23	340.593	1041.500
24	355.439	1043.648
25	370.224	1046.178
26	384.938	1049.090
27	399.573	1052.381
28	414.118	1056.049
29	428.563	1060.091
30	442.898	1064.505
31	457.115	1069.289
32	471.204	1074.438
33	485.155	1079.949
34	498.958	1085.819
35	512.606	1092.044
36	526.088	1098.619
37	539.396	1105.540
38	552.520	1112.803
39	565.453	1120.402
40	578.184	1128.333
41	590.707	1136.591
42	603.012	1145.169
43	615.091	1154.062
44	626.937	1163.265
45	638.541	1172.770
46	649.895	1182.572
47	660.992	1192.664
48	671.825	1203.040
49	682.386	1213.692
50	692.668	1224.613
51	702.665	1235.796
52	712.370	1247.234
53	721.775	1258.919
54	730.876	1270.843
55	739.666	1282.998
56	748.138	1295.376
57	756.288	1307.968
58	756.792	1308.793

Circle Center At X = 264.905 ; Y = 1617.026 ; and Radius = 580.482

Factor of Safety

*** 1.874 ***

Failure Surface Specified By 58 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	19.639	1091.072
2	32.886	1084.035
3	46.325	1077.371
4	59.945	1071.087
5	73.735	1065.186
6	87.686	1059.673
7	101.785	1054.554
8	116.022	1049.831
9	130.386	1045.509
10	144.865	1041.590
11	159.448	1038.079
12	174.124	1034.977
13	188.881	1032.288

14	203.707	1030.012
15	218.592	1028.153
16	233.522	1026.711
17	248.487	1025.688
18	263.475	1025.084
19	278.474	1024.900
20	293.472	1025.136
21	308.458	1025.792
22	323.419	1026.867
23	338.345	1028.361
24	353.222	1030.272
25	368.041	1032.599
26	382.788	1035.340
27	397.453	1038.493
28	412.024	1042.055
29	426.490	1046.024
30	440.838	1050.396
31	455.059	1055.168
32	469.140	1060.337
33	483.071	1065.898
34	496.841	1071.846
35	510.439	1078.178
36	523.855	1084.888
37	537.077	1091.972
38	550.096	1099.422
39	562.901	1107.235
40	575.482	1115.402
41	587.830	1123.919
42	599.934	1132.778
43	611.786	1141.973
44	623.375	1151.496
45	634.693	1161.339
46	645.731	1171.496
47	656.481	1181.958
48	666.933	1192.717
49	677.080	1203.764
50	686.914	1215.091
51	696.427	1226.688
52	705.611	1238.548
53	714.460	1250.660
54	722.966	1263.015
55	731.122	1275.604
56	738.923	1288.415
57	746.362	1301.441
58	748.525	1305.485

Circle Center At X = 277.533 ; Y = 1560.484 ; and Radius = 535.590

Factor of Safety

*** 1.875 ***

Failure Surface Specified By 58 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	4.008	1095.098
2	17.391	1088.323
3	30.950	1081.908
4	44.676	1075.859
5	58.559	1070.179
6	72.589	1064.873
7	86.756	1059.944
8	101.050	1055.396
9	115.461	1051.232
10	129.978	1047.455
11	144.590	1044.068
12	159.288	1041.073
13	174.061	1038.473
14	188.898	1036.269
15	203.789	1034.462
16	218.723	1033.055

17	233.689	1032.048
18	248.677	1031.442
19	263.675	1031.237
20	278.674	1031.433
21	293.662	1032.031
22	308.629	1033.030
23	323.564	1034.429
24	338.455	1036.227
25	353.294	1038.422
26	368.068	1041.015
27	382.768	1044.001
28	397.382	1047.380
29	411.901	1051.148
30	426.314	1055.304
31	440.610	1059.844
32	454.780	1064.765
33	468.813	1070.063
34	482.700	1075.735
35	496.429	1081.777
36	509.992	1088.184
37	523.379	1094.951
38	536.579	1102.074
39	549.585	1109.548
40	562.386	1117.367
41	574.972	1125.526
42	587.337	1134.019
43	599.469	1142.840
44	611.361	1151.982
45	623.004	1161.439
46	634.390	1171.205
47	645.510	1181.271
48	656.358	1191.632
49	666.924	1202.279
50	677.201	1213.205
51	687.182	1224.402
52	696.860	1235.862
53	706.228	1247.577
54	715.279	1259.539
55	724.007	1271.738
56	732.405	1284.167
57	740.467	1296.816
58	744.771	1303.984

Circle Center At X = 263.823 ; Y = 1591.638 ; and Radius = 560.407

Factor of Safety
*** 1.876 ***

Failure Surface Specified By 61 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	34.068	1089.649
2	47.546	1083.064
3	61.186	1076.825
4	74.981	1070.935
5	88.922	1065.398
6	102.999	1060.217
7	117.204	1055.397
8	131.526	1050.940
9	145.957	1046.849
10	160.488	1043.127
11	175.109	1039.776
12	189.811	1036.798
13	204.583	1034.196
14	219.417	1031.971
15	234.303	1030.124
16	249.231	1028.656
17	264.192	1027.569
18	279.175	1026.864
19	294.172	1026.540

20	309.172	1026.598
21	324.165	1027.038
22	339.143	1027.859
23	354.094	1029.062
24	369.011	1030.645
25	383.882	1032.607
26	398.698	1034.947
27	413.450	1037.664
28	428.128	1040.755
29	442.723	1044.219
30	457.224	1048.053
31	471.623	1052.256
32	485.911	1056.823
33	500.078	1061.753
34	514.114	1067.042
35	528.012	1072.687
36	541.761	1078.684
37	555.353	1085.029
38	568.779	1091.717
39	582.030	1098.746
40	595.099	1106.109
41	607.975	1113.803
42	620.651	1121.823
43	633.120	1130.162
44	645.371	1138.816
45	657.399	1147.780
46	669.194	1157.046
47	680.750	1166.610
48	692.058	1176.465
49	703.112	1186.605
50	713.904	1197.023
51	724.427	1207.712
52	734.675	1218.666
53	744.641	1229.877
54	754.317	1241.338
55	763.699	1253.042
56	772.780	1264.981
57	781.554	1277.147
58	790.015	1289.533
59	798.159	1302.130
60	805.979	1314.930
61	808.630	1319.529

Circle Center At X = 299.393 ; Y = 1615.622 ; and Radius = 589.105

Factor of Safety

*** 1.877 ***

Failure Surface Specified By 68 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	2.405	1095.511
2	15.749	1088.660
3	29.248	1082.118
4	42.893	1075.890
5	56.679	1069.977
6	70.597	1064.383
7	84.640	1059.111
8	98.801	1054.165
9	113.072	1049.545
10	127.445	1045.256
11	141.914	1041.299
12	156.470	1037.677
13	171.105	1034.390
14	185.813	1031.442
15	200.584	1028.833
16	215.412	1026.565
17	230.288	1024.639
18	245.204	1023.057
19	260.153	1021.818

20	275.126	1020.924
21	290.116	1020.376
22	305.115	1020.173
23	320.114	1020.315
24	335.106	1020.803
25	350.083	1021.636
26	365.037	1022.813
27	379.959	1024.335
28	394.843	1026.201
29	409.680	1028.408
30	424.461	1030.957
31	439.181	1033.846
32	453.829	1037.073
33	468.400	1040.636
34	482.885	1044.534
35	497.276	1048.765
36	511.565	1053.326
37	525.746	1058.216
38	539.811	1063.430
39	553.751	1068.967
40	567.561	1074.824
41	581.231	1080.997
42	594.756	1087.484
43	608.128	1094.280
44	621.340	1101.383
45	634.385	1108.788
46	647.255	1116.492
47	659.945	1124.490
48	672.448	1132.778
49	684.755	1141.352
50	696.863	1150.207
51	708.763	1159.339
52	720.449	1168.742
53	731.916	1178.412
54	743.157	1188.344
55	754.166	1198.532
56	764.938	1208.971
57	775.466	1219.656
58	785.745	1230.580
59	795.771	1241.738
60	805.536	1253.124
61	815.036	1264.731
62	824.267	1276.555
63	833.223	1288.588
64	841.899	1300.824
65	850.291	1313.257
66	858.394	1325.880
67	866.205	1338.686
68	869.123	1343.729

Circle Center At X = 306.429 ; Y = 1671.226 ; and Radius = 651.060

Factor of Safety
*** 1.878 ***

Failure Surface Specified By 59 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	39.279	1089.471
2	52.940	1083.276
3	66.754	1077.431
4	80.713	1071.940
5	94.806	1066.805
6	109.026	1062.031
7	123.363	1057.619
8	137.807	1053.574
9	152.350	1049.898
10	166.981	1046.594
11	181.692	1043.662
12	196.473	1041.106

13	211.314	1038.927
14	226.205	1037.125
15	241.137	1035.704
16	256.101	1034.663
17	271.087	1034.002
18	286.084	1033.724
19	301.084	1033.827
20	316.076	1034.311
21	331.051	1035.177
22	345.999	1036.424
23	360.911	1038.051
24	375.776	1040.056
25	390.585	1042.439
26	405.330	1045.198
27	419.999	1048.332
28	434.583	1051.837
29	449.074	1055.713
30	463.461	1059.955
31	477.736	1064.563
32	491.889	1069.532
33	505.911	1074.860
34	519.793	1080.543
35	533.526	1086.577
36	547.100	1092.959
37	560.508	1099.684
38	573.741	1106.748
39	586.790	1114.146
40	599.646	1121.874
41	612.301	1129.926
42	624.747	1138.298
43	636.977	1146.984
44	648.981	1155.979
45	660.753	1165.275
46	672.284	1174.869
47	683.567	1184.752
48	694.596	1194.920
49	705.362	1205.364
50	715.858	1216.079
51	726.079	1227.058
52	736.017	1238.294
53	745.666	1249.778
54	755.020	1261.505
55	764.072	1273.465
56	772.817	1285.652
57	781.250	1298.058
58	789.363	1310.674
59	790.285	1312.190

Circle Center At X = 289.535 ; Y = 1623.212 ; and Radius = 589.498

Factor of Safety

*** 1.881 ***

Failure Surface Specified By 56 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	33.667	1089.663
2	47.351	1083.517
3	61.193	1077.739
4	75.185	1072.333
5	89.316	1067.303
6	103.577	1062.651
7	117.957	1058.383
8	132.446	1054.500
9	147.033	1051.005
10	161.708	1047.901
11	176.461	1045.191
12	191.281	1042.875
13	206.158	1040.956
14	221.081	1039.435

15	236.039	1038.313
16	251.021	1037.591
17	266.018	1037.270
18	281.018	1037.349
19	296.010	1037.828
20	310.984	1038.708
21	325.930	1039.988
22	340.835	1041.667
23	355.691	1043.742
24	370.486	1046.214
25	385.210	1049.081
26	399.851	1052.339
27	414.401	1055.988
28	428.848	1060.023
29	443.182	1064.443
30	457.393	1069.245
31	471.470	1074.424
32	485.404	1079.978
33	499.185	1085.901
34	512.803	1092.191
35	526.247	1098.842
36	539.510	1105.850
37	552.580	1113.209
38	565.450	1120.915
39	578.108	1128.962
40	590.548	1137.344
41	602.759	1146.056
42	614.733	1155.090
43	626.461	1164.442
44	637.936	1174.103
45	649.148	1184.067
46	660.090	1194.327
47	670.755	1204.875
48	681.133	1215.705
49	691.219	1226.808
50	701.005	1238.176
51	710.483	1249.802
52	719.648	1261.677
53	728.492	1273.792
54	737.009	1286.140
55	745.194	1298.710
56	749.621	1305.924

Circle Center At X = 270.547 ; Y = 1598.696 ; and Radius = 561.451

Factor of Safety
*** 1.881 ***

Failure Surface Specified By 62 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	9.218	1093.756
2	22.225	1086.283
3	35.425	1079.160
4	48.811	1072.390
5	62.372	1065.980
6	76.099	1059.932
7	89.982	1054.252
8	104.011	1048.944
9	118.177	1044.010
10	132.469	1039.456
11	146.877	1035.284
12	161.391	1031.497
13	176.001	1028.097
14	190.696	1025.088
15	205.465	1022.471
16	220.300	1020.248
17	235.188	1018.420
18	250.120	1016.990
19	265.084	1015.957

20	280.071	1015.324
21	295.069	1015.089
22	310.068	1015.254
23	325.057	1015.818
24	340.026	1016.781
25	354.965	1018.141
26	369.861	1019.900
27	384.706	1022.054
28	399.488	1024.602
29	414.197	1027.543
30	428.822	1030.874
31	443.353	1034.594
32	457.781	1038.699
33	472.094	1043.187
34	486.282	1048.054
35	500.336	1053.297
36	514.245	1058.912
37	528.000	1064.896
38	541.591	1071.243
39	555.008	1077.951
40	568.241	1085.012
41	581.282	1092.424
42	594.121	1100.180
43	606.749	1108.276
44	619.158	1116.704
45	631.337	1125.460
46	643.279	1134.537
47	654.975	1143.928
48	666.417	1153.628
49	677.596	1163.629
50	688.506	1173.924
51	699.137	1184.505
52	709.484	1195.366
53	719.537	1206.498
54	729.290	1217.894
55	738.737	1229.546
56	747.870	1241.445
57	756.683	1253.583
58	765.170	1265.951
59	773.325	1278.541
60	781.142	1291.343
61	788.615	1304.349
62	793.552	1313.497

Circle Center At X = 296.370 ; Y = 1578.461 ; and Radius = 563.379

Factor of Safety
*** 1.882 ***

Failure Surface Specified By 58 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.647	1090.039
2	37.726	1084.862
3	51.919	1080.010
4	66.220	1075.485
5	80.622	1071.290
6	95.116	1067.427
7	109.695	1063.897
8	124.351	1060.704
9	139.076	1057.848
10	153.864	1055.331
11	168.705	1053.154
12	183.592	1051.318
13	198.518	1049.826
14	213.473	1048.676
15	228.452	1047.870
16	243.445	1047.408
17	258.444	1047.291
18	273.442	1047.518

19	288.432	1048.090
20	303.404	1049.006
21	318.351	1050.266
22	333.265	1051.869
23	348.138	1053.813
24	362.963	1056.099
25	377.731	1058.725
26	392.436	1061.689
27	407.068	1064.991
28	421.620	1068.627
29	436.085	1072.597
30	450.456	1076.898
31	464.723	1081.528
32	478.881	1086.484
33	492.920	1091.764
34	506.835	1097.366
35	520.618	1103.285
36	534.261	1109.520
37	547.757	1116.066
38	561.099	1122.921
39	574.281	1130.080
40	587.294	1137.540
41	600.133	1145.297
42	612.790	1153.347
43	625.258	1161.685
44	637.532	1170.307
45	649.605	1179.210
46	661.470	1188.387
47	673.121	1197.834
48	684.552	1207.547
49	695.757	1217.519
50	706.730	1227.746
51	717.465	1238.223
52	727.957	1248.943
53	738.199	1259.902
54	748.188	1271.092
55	757.916	1282.510
56	767.380	1294.148
57	776.574	1306.000
58	778.174	1308.164

Circle Center At X = 256.041 ; Y = 1700.230 ; and Radius = 652.947

Factor of Safety

*** 1.882 ***

**** END OF GSTABL7 OUTPUT ****

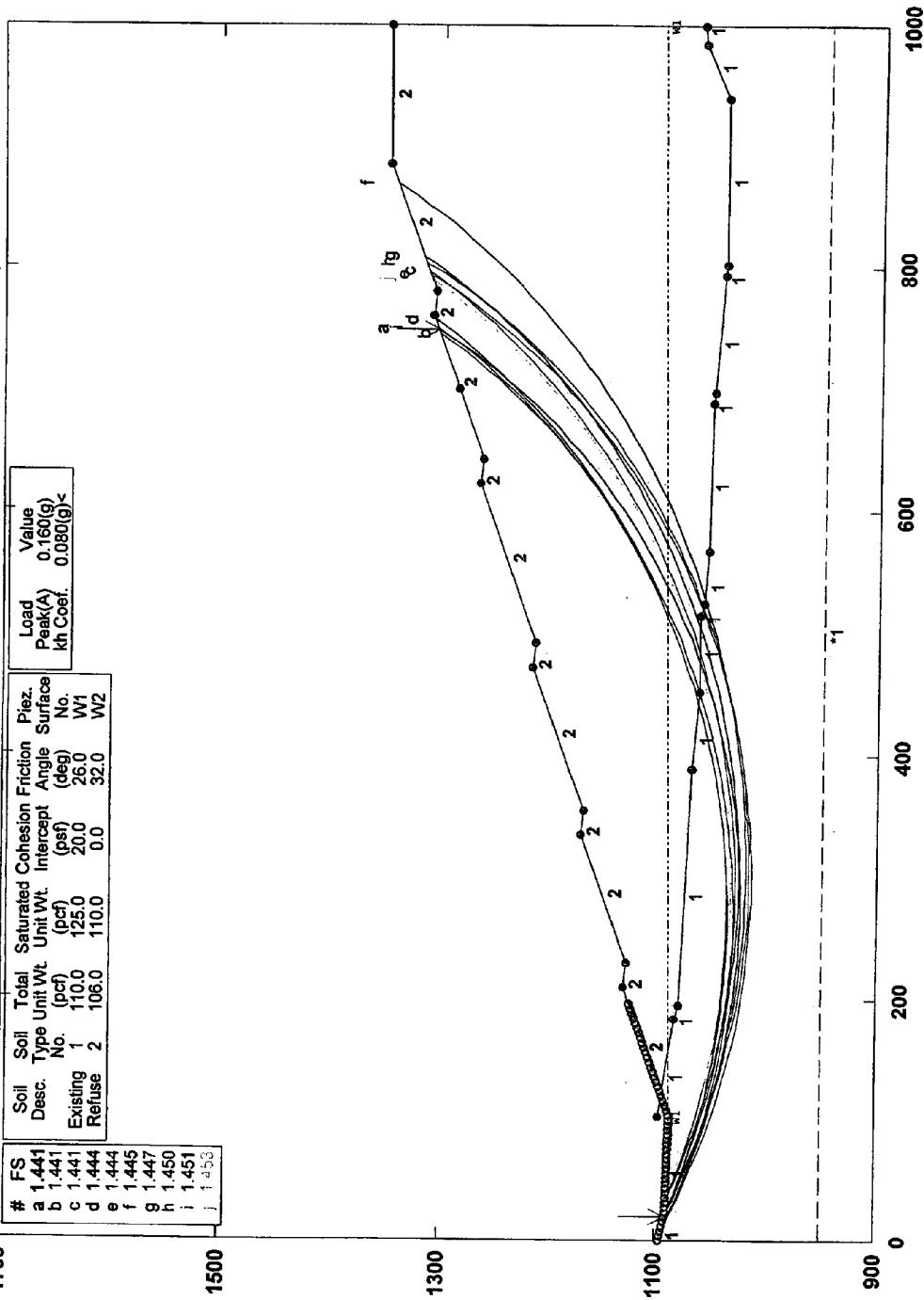
American Energy Corporation

Expanded Coarse Coal Refuse Disposal Facility

Seismic Analysis

American Energy Refuse Site Revised Expanded Refuse Site 11-21-08

z:\jobs\client\american energy corp\02001-11\engineering\proposed beltline refuse pile\stability analysis 11-21-08\refuse .p12 Run By: Username 11/22/2008 12:21PM



GSTABL7 v.2 FSmin=1.441
Safety Factors Are Calculated By The Modified Bishop Method



*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.005, Sept. 2006 **
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SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

Analysis Run Date: 11/22/2008
Time of Run: 12:21PM
Run By: Username
Input Data Filename: z:\Jobs\Client\American Energy Corp\02001-11\Engineering\Proposed
Beltline Refuse Pile\Stability Analysis 11-21-08\refuse .in
Output Filename: z:\Jobs\Client\American Energy
Corp\02001-11\Engineering\Proposed Beltline Refuse Pile\Stability Analysis 11-21-08\refuse .OUT
Unit System: English
Plotted Output Filename: z:\Jobs\Client\American Energy Corp\02001-11\Engineering\Proposed
Beltline Refuse Pile\Stability Analysis 11-21-08\refuse .PLT
PROBLEM DESCRIPTION: American Energy Refuse Site
Revised Expanded Refuse Site 11-21-08

BOUNDARY COORDINATES
14 Top Boundaries
28 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	1096.13	23.80	1090.00	1
2	23.80	1090.00	103.06	1087.29	1
3	103.06	1087.29	209.84	1130.00	2
4	209.84	1130.00	229.84	1128.00	2
5	229.84	1128.00	334.83	1170.00	2
6	334.83	1170.00	354.83	1168.00	2
7	354.83	1168.00	472.32	1215.00	2
8	472.32	1215.00	492.32	1213.00	2
9	492.32	1213.00	622.32	1265.00	2
10	622.32	1265.00	642.32	1263.00	2
11	642.32	1263.00	759.81	1310.00	2
12	759.81	1310.00	779.81	1308.00	2
13	779.81	1308.00	884.80	1350.00	2
14	884.80	1350.00	1000.00	1350.00	2
15	103.06	1097.29	183.53	1084.00	1
16	183.53	1084.00	194.95	1080.00	1
17	194.95	1080.00	388.92	1070.00	1
18	388.92	1070.00	452.16	1064.00	1
19	452.16	1064.00	514.76	1064.00	1
20	514.76	1064.00	524.48	1060.00	1
21	524.48	1060.00	567.50	1056.00	1
22	567.50	1056.00	689.15	1054.00	1
23	689.15	1054.00	697.47	1052.00	1
24	697.47	1052.00	794.31	1044.00	1
25	794.31	1044.00	802.08	1042.00	1
26	802.08	1042.00	939.54	1042.00	1
27	939.54	1042.00	985.35	1064.00	1
28	985.35	1064.00	1000.00	1064.42	1

User Specified Y-Origin = 900.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param. (psf)	Pressure Constant (psf)	Piez. Surface No.
1	110.0	125.0	20.0	26.0	0.00	0.0	1

2 106.0 110.0 0.0 32.0 0.00 0.0 2
 1 PIEZOMETRIC SURFACE(S) SPECIFIED
 Unit Weight of Water = 62.40 (pcf)
 Piezometric Surface No. 1 Specified by 2 Coordinate Points
 Pore Pressure Inclination Factor = 0.50
 Point X-Water Y-Water
 No. (ft) (ft)
 1 103.06 1087.29
 2 1000.00 1100.00

Searching Routine Will Be Limited To An Area Defined By 1 Boundaries
 Of Which The First 1 Boundaries Will Deflect Surfaces Upward

Boundary	X-Left	Y-Left	X-Right	Y-Right
No.	(ft)	(ft)	(ft)	(ft)
1	0.00	950.00	1000.00	950.00

Specified Peak Ground Acceleration Coefficient (A) = 0.160(g)
 Specified Horizontal Earthquake Coefficient (kh) = 0.080(g)
 Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
 Specified Seismic Pore-Pressure Factor = 0.000

A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Circular Surfaces, Has Been Specified.

500 Trial Surfaces Have Been Generated.
 1 Surface(s) Initiate(s) From Each Of 500 Points Equally Spaced
 Along The Ground Surface Between X = 0.00(ft)
 and X = 200.00(ft)

Each Surface Terminates Between X = 700.00(ft)
 and X = 1000.00(ft)

Unless Further Limitations Were Imposed, The Minimum Elevation
 At Which A Surface Extends Is Y = 950.00(ft)

15.00(ft) Line Segments Define Each Trial Failure Surface.
 Following Are Displayed The Ten Most Critical Of The Trial

Failure Surfaces Evaluated. They Are
 Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Total Number of Trial Surfaces Attempted = 500

Number of Trial Surfaces With Valid FS = 500

Statistical Data On All Valid FS Values:

FS Max = 1.993 FS Min = 1.441 FS Ave = 1.644

Standard Deviation = 0.130 Coefficient of Variation = 7.93 %

Failure Surface Specified By 58 Coordinate Points

Point	X-Surf	Y-Surf
No.	(ft)	(ft)
1	19.639	1091.072
2	32.886	1084.035
3	46.325	1077.371
4	59.945	1071.087
5	73.735	1065.186
6	87.686	1059.673
7	101.785	1054.554
8	116.022	1049.831
9	130.386	1045.509
10	144.865	1041.590
11	159.448	1038.079
12	174.124	1034.977
13	188.881	1032.288
14	203.707	1030.012
15	218.592	1028.153
16	233.522	1026.711
17	248.487	1025.688
18	263.475	1025.084
19	278.474	1024.900
20	293.472	1025.136
21	308.458	1025.792
22	323.419	1026.867
23	338.345	1028.361
24	353.222	1030.272
25	368.041	1032.599
26	382.788	1035.340

27	397.453	1038.493
28	412.024	1042.055
29	426.490	1046.024
30	440.838	1050.396
31	455.059	1055.168
32	469.140	1060.337
33	483.071	1065.898
34	496.841	1071.846
35	510.439	1078.178
36	523.855	1084.888
37	537.077	1091.972
38	550.096	1099.422
39	562.901	1107.235
40	575.482	1115.402
41	587.830	1123.919
42	599.934	1132.778
43	611.786	1141.973
44	623.375	1151.496
45	634.693	1161.339
46	645.731	1171.496
47	656.481	1181.958
48	666.933	1192.717
49	677.080	1203.764
50	686.914	1215.091
51	696.427	1226.688
52	705.611	1238.548
53	714.460	1250.660
54	722.966	1263.015
55	731.122	1275.604
56	738.923	1288.415
57	746.362	1301.441
58	748.525	1305.485

Circle Center At X = 277.533 ; Y = 1560.484 ; and Radius = 535.590

Factor of Safety
*** 1.441 ***

Slice No.	Width (ft)	Weight (lbs)	Individual data on the		74 slices		Earthquake		
			Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Force Hor (lbs)	Force Ver (lbs)	Surcharge Load (lbs)
1	4.2	260.5	0.0	0.0	0.	0.	20.8	0.0	0.0
2	9.1	3394.8	0.0	0.0	0.	0.	271.6	0.0	0.0
3	13.4	14091.1	0.0	5323.3	0.	0.	1127.3	0.0	0.0
4	13.6	24649.3	0.0	11561.8	0.	0.	1971.9	0.0	0.0
5	13.8	34789.7	0.0	17445.7	0.	0.	2783.2	0.0	0.0
6	14.0	44457.2	0.0	22970.5	0.	0.	3556.6	0.0	0.0
7	14.1	53598.7	0.0	28131.6	0.	0.	4287.9	0.0	0.0
8	1.3	5253.5	0.0	2760.6	0.	0.	420.3	0.0	0.0
9	13.0	61251.9	0.0	30164.7	0.	0.	4900.1	0.0	0.0
10	14.4	83848.0	0.0	37347.5	0.	0.	6707.8	0.0	0.0
11	14.5	100738.5	0.0	41395.2	0.	0.	8059.1	0.0	0.0
12	14.0	111804.0	0.0	43067.2	0.	0.	8944.3	0.0	0.0
13	0.6	5319.5	0.0	1997.5	0.	0.	425.6	0.0	0.0
14	14.7	132627.2	0.0	48353.5	0.	0.	10610.2	0.0	0.0
15	9.4	92280.1	0.0	32358.4	0.	0.	7382.4	0.0	0.0
16	5.4	54897.0	0.0	18900.4	0.	0.	4391.8	0.0	0.0
17	6.1	64225.3	0.0	21732.3	0.	0.	5138.0	0.0	0.0
18	8.8	96458.6	0.0	32046.0	0.	0.	7716.7	0.0	0.0
19	6.1	70247.5	0.0	22801.3	0.	0.	5619.8	0.0	0.0
20	8.8	101933.8	0.0	33108.9	0.	0.	8154.7	0.0	0.0
21	11.2	131242.0	0.0	43290.3	0.	0.	10499.4	0.0	0.0
22	3.7	43336.4	0.0	14362.4	0.	0.	3466.9	0.0	0.0
23	15.0	183193.2	0.0	59004.4	0.	0.	14655.5	0.0	0.0
24	15.0	194295.0	0.0	59964.6	0.	0.	15543.6	0.0	0.0
25	15.0	204492.1	0.0	60532.1	0.	0.	16359.4	0.0	0.0
26	15.0	213751.4	0.0	60706.5	0.	0.	17100.1	0.0	0.0
27	15.0	222044.7	0.0	60488.0	0.	0.	17763.6	0.0	0.0

28	15.0	229346.3	0.0	59876.2	0.	0.	18347.7	0.0	0.0
29	11.4	179569.5	0.0	45117.0	0.	0.	14365.6	0.0	0.0
30	3.5	55741.0	0.0	13755.4	0.	0.	4459.3	0.0	0.0
31	14.9	232264.9	0.0	57476.6	0.	0.	18581.2	0.0	0.0
32	1.6	24725.9	0.0	6137.4	0.	0.	1978.1	0.0	0.0
33	13.2	204765.3	0.0	49552.9	0.	0.	16381.2	0.0	0.0
34	14.7	232683.4	0.0	53514.8	0.	0.	18614.7	0.0	0.0
35	6.1	97841.5	0.0	21639.4	0.	0.	7827.3	0.0	0.0
36	8.5	137041.6	0.0	29312.5	0.	0.	10963.3	0.0	0.0
37	14.6	235925.2	0.0	48003.3	0.	0.	18874.0	0.0	0.0
38	14.5	235936.1	0.0	44672.0	0.	0.	18874.9	0.0	0.0
39	14.3	234943.7	0.0	40959.7	0.	0.	18795.5	0.0	0.0
40	11.3	185501.0	0.0	29701.5	0.	0.	14840.1	0.0	0.0
41	2.9	47474.3	0.0	7168.6	0.	0.	3797.9	0.0	0.0
42	14.1	230280.7	0.0	32405.9	0.	0.	18422.5	0.0	0.0
43	3.2	51885.4	0.0	6735.2	0.	0.	4150.8	0.0	0.0
44	6.0	96701.7	0.0	11991.5	0.	0.	7736.1	0.0	0.0
45	4.8	75190.9	0.0	0.0	0.	0.	6015.3	0.0	0.0
46	9.2	142707.7	0.0	0.0	0.	0.	11416.6	0.0	0.0
47	4.5	68551.0	0.0	0.0	0.	0.	5484.1	0.0	0.0
48	13.6	205421.0	0.0	0.0	0.	0.	16433.7	0.0	0.0
49	13.4	201071.8	0.0	0.0	0.	0.	16085.7	0.0	0.0
50	13.2	195978.1	0.0	0.0	0.	0.	15678.2	0.0	0.0
51	2.6	38683.4	0.0	0.0	0.	0.	3094.7	0.0	0.0
52	10.4	151491.8	0.0	0.0	0.	0.	12119.3	0.0	0.0
53	12.8	183705.6	0.0	0.0	0.	0.	14696.4	0.0	0.0
54	12.6	176611.1	0.0	0.0	0.	0.	14128.9	0.0	0.0
55	12.3	168938.2	0.0	0.0	0.	0.	13515.1	0.0	0.0
56	12.1	160736.2	0.0	0.0	0.	0.	12858.9	0.0	0.0
57	11.9	152058.0	0.0	0.0	0.	0.	12164.6	0.0	0.0
58	10.5	130192.5	0.0	0.0	0.	0.	10415.4	0.0	0.0
59	1.1	12735.7	0.0	0.0	0.	0.	1018.9	0.0	0.0
60	11.3	129464.6	0.0	0.0	0.	0.	10357.2	0.0	0.0
61	7.6	79657.9	0.0	0.0	0.	0.	6372.6	0.0	0.0
62	3.4	33903.2	0.0	0.0	0.	0.	2712.3	0.0	0.0
63	10.7	102308.5	0.0	0.0	0.	0.	8184.7	0.0	0.0
64	10.5	92423.0	0.0	0.0	0.	0.	7393.8	0.0	0.0
65	10.1	82428.2	0.0	0.0	0.	0.	6594.3	0.0	0.0
66	9.8	72387.9	0.0	0.0	0.	0.	5791.0	0.0	0.0
67	9.5	62368.6	0.0	0.0	0.	0.	4989.5	0.0	0.0
68	9.2	52437.8	0.0	0.0	0.	0.	4195.0	0.0	0.0
69	8.8	42662.0	0.0	0.0	0.	0.	3413.0	0.0	0.0
70	8.5	33109.8	0.0	0.0	0.	0.	2648.8	0.0	0.0
71	8.2	23848.6	0.0	0.0	0.	0.	1907.9	0.0	0.0
72	7.8	14946.1	0.0	0.0	0.	0.	1195.7	0.0	0.0
73	7.4	6469.8	0.0	0.0	0.	0.	517.6	0.0	0.0
74	2.2	364.4	0.0	0.0	0.	0.	29.2	0.0	0.0

Failure Surface Specified By 58 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	4.008	1095.098
2	17.391	1088.323
3	30.950	1081.908
4	44.676	1075.859
5	58.559	1070.179
6	72.589	1064.873
7	86.756	1059.944
8	101.050	1055.396
9	115.461	1051.232
10	129.978	1047.455
11	144.590	1044.068
12	159.288	1041.073
13	174.061	1038.473
14	188.898	1036.269
15	203.789	1034.462
16	218.723	1033.055
17	233.689	1032.048

18	248.677	1031.442
19	263.675	1031.237
20	278.674	1031.433
21	293.662	1032.031
22	308.629	1033.030
23	323.564	1034.429
24	338.455	1036.227
25	353.294	1038.422
26	368.068	1041.015
27	382.768	1044.001
28	397.382	1047.380
29	411.901	1051.148
30	426.314	1055.304
31	440.610	1059.844
32	454.780	1064.765
33	468.813	1070.063
34	482.700	1075.735
35	496.429	1081.777
36	509.992	1088.184
37	523.379	1094.951
38	536.579	1102.074
39	549.585	1109.548
40	562.386	1117.367
41	574.972	1125.526
42	587.337	1134.019
43	599.469	1142.840
44	611.361	1151.982
45	623.004	1161.439
46	634.390	1171.205
47	645.510	1181.271
48	656.358	1191.632
49	666.924	1202.279
50	677.201	1213.205
51	687.182	1224.402
52	696.860	1235.862
53	706.228	1247.577
54	715.279	1259.539
55	724.007	1271.738
56	732.405	1284.167
57	740.467	1296.816
58	744.771	1303.984

Circle Center At X = 263.823 ; Y = 1591.638 ; and Radius = 560.407

Factor of Safety

*** 1.441 ***

Failure Surface Specified By 60 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	21.242	1090.659
2	34.808	1084.258
3	48.529	1078.197
4	62.397	1072.480
5	76.403	1067.110
6	90.538	1062.091
7	104.795	1057.427
8	119.163	1053.119
9	133.634	1049.170
10	148.199	1045.584
11	162.848	1042.362
12	177.574	1039.506
13	192.366	1037.018
14	207.216	1034.899
15	222.114	1033.152
16	237.051	1031.776
17	252.017	1030.773
18	267.004	1030.143
19	282.002	1029.888
20	297.001	1030.006

21	311.993	1030.498
22	326.968	1031.364
23	341.917	1032.603
24	356.830	1034.214
25	371.699	1036.196
26	386.513	1038.548
27	401.264	1041.269
28	415.943	1044.357
29	430.540	1047.810
30	445.047	1051.625
31	459.454	1055.801
32	473.752	1060.335
33	487.933	1065.224
34	501.988	1070.465
35	515.907	1076.054
36	529.683	1081.989
37	543.307	1088.266
38	556.770	1094.880
39	570.064	1101.828
40	583.180	1109.105
41	596.112	1116.706
42	608.849	1124.628
43	621.385	1132.865
44	633.712	1141.411
45	645.822	1150.263
46	657.708	1159.413
47	669.362	1168.857
48	680.777	1178.589
49	691.945	1188.602
50	702.861	1198.890
51	713.517	1209.447
52	723.906	1220.267
53	734.022	1231.342
54	743.859	1242.666
55	753.411	1254.232
56	762.671	1266.032
57	771.635	1278.059
58	780.295	1290.307
59	788.648	1302.766
60	796.111	1314.521

Circle Center At X = 284.757 ; Y = 1631.521 ; and Radius = 601.641

Factor of Safety
*** 1.441 ***

Failure Surface Specified By 58 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	18.838	1091.278
2	32.504	1085.096
3	46.326	1079.269
4	60.294	1073.801
5	74.399	1068.695
6	88.630	1063.956
7	102.980	1059.586
8	117.437	1055.589
9	131.993	1051.966
10	146.638	1048.720
11	161.361	1045.854
12	176.154	1043.370
13	191.006	1041.268
14	205.908	1039.551
15	220.848	1038.219
16	235.819	1037.274
17	250.808	1036.716
18	265.807	1036.545
19	280.806	1036.762
20	295.793	1037.367
21	310.761	1038.359

22	325.697	1039.736
23	340.593	1041.500
24	355.439	1043.648
25	370.224	1046.178
26	384.938	1049.090
27	399.573	1052.381
28	414.118	1056.049
29	428.563	1060.091
30	442.898	1064.505
31	457.115	1069.289
32	471.204	1074.438
33	485.155	1079.949
34	498.958	1085.819
35	512.606	1092.044
36	526.088	1098.619
37	539.396	1105.540
38	552.520	1112.803
39	565.453	1120.402
40	578.184	1128.333
41	590.707	1136.591
42	603.012	1145.169
43	615.091	1154.062
44	626.937	1163.265
45	638.541	1172.770
46	649.895	1182.572
47	660.992	1192.664
48	671.825	1203.040
49	682.386	1213.692
50	692.668	1224.613
51	702.665	1235.796
52	712.370	1247.234
53	721.775	1258.919
54	730.876	1270.843
55	739.666	1282.998
56	748.138	1295.376
57	756.288	1307.968
58	756.792	1308.793

Circle Center At X = 264.905 ; Y = 1617.026 ; and Radius = 580.482

Factor of Safety
*** 1.444 ***

Failure Surface Specified By 62 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	9.218	1093.756
2	22.225	1086.283
3	35.425	1079.160
4	48.811	1072.390
5	62.372	1065.980
6	76.099	1059.932
7	89.982	1054.252
8	104.011	1048.944
9	118.177	1044.010
10	132.469	1039.456
11	146.877	1035.284
12	161.391	1031.497
13	176.001	1028.097
14	190.696	1025.088
15	205.465	1022.471
16	220.300	1020.248
17	235.188	1018.420
18	250.120	1016.990
19	265.084	1015.957
20	280.071	1015.324
21	295.069	1015.089
22	310.068	1015.254
23	325.057	1015.818
24	340.026	1016.781

25	354.965	1018.141
26	369.861	1019.900
27	384.706	1022.054
28	399.488	1024.602
29	414.197	1027.543
30	428.822	1030.874
31	443.353	1034.594
32	457.781	1038.699
33	472.094	1043.187
34	486.282	1048.054
35	500.336	1053.297
36	514.245	1058.912
37	528.000	1064.896
38	541.591	1071.243
39	555.008	1077.951
40	568.241	1085.012
41	581.282	1092.424
42	594.121	1100.180
43	606.749	1108.276
44	619.158	1116.704
45	631.337	1125.460
46	643.279	1134.537
47	654.975	1143.928
48	666.417	1153.628
49	677.596	1163.629
50	688.506	1173.924
51	699.137	1184.505
52	709.484	1195.366
53	719.537	1206.498
54	729.290	1217.894
55	738.737	1229.546
56	747.870	1241.445
57	756.683	1253.583
58	765.170	1265.951
59	773.325	1278.541
60	781.142	1291.343
61	788.615	1304.349
62	793.552	1313.497

Circle Center At X = 296.370 ; Y = 1578.461 ; and Radius = 563.379

Factor of Safety

*** 1.444 ***

Failure Surface Specified By 68 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	2.405	1095.511
2	15.749	1088.660
3	29.248	1082.118
4	42.893	1075.890
5	56.679	1069.977
6	70.597	1064.383
7	84.640	1059.111
8	98.801	1054.165
9	113.072	1049.545
10	127.445	1045.256
11	141.914	1041.299
12	156.470	1037.677
13	171.105	1034.390
14	185.813	1031.442
15	200.584	1028.833
16	215.412	1026.565
17	230.288	1024.639
18	245.204	1023.057
19	260.153	1021.818
20	275.126	1020.924
21	290.116	1020.376
22	305.115	1020.173
23	320.114	1020.315

24	335.106	1020.803
25	350.083	1021.636
26	365.037	1022.813
27	379.959	1024.335
28	394.843	1026.201
29	409.680	1028.408
30	424.461	1030.957
31	439.181	1033.846
32	453.829	1037.073
33	468.400	1040.636
34	482.885	1044.534
35	497.276	1048.765
36	511.565	1053.326
37	525.746	1058.216
38	539.811	1063.430
39	553.751	1068.967
40	567.561	1074.824
41	581.231	1080.997
42	594.756	1087.484
43	608.128	1094.280
44	621.340	1101.383
45	634.385	1108.788
46	647.255	1116.492
47	659.945	1124.490
48	672.448	1132.778
49	684.755	1141.352
50	696.863	1150.207
51	708.763	1159.339
52	720.449	1168.742
53	731.916	1178.412
54	743.157	1188.344
55	754.166	1198.532
56	764.938	1208.971
57	775.466	1219.656
58	785.745	1230.580
59	795.771	1241.738
60	805.536	1253.124
61	815.036	1264.731
62	824.267	1276.555
63	833.223	1288.588
64	841.899	1300.824
65	850.291	1313.257
66	858.394	1325.880
67	866.205	1338.686
68	869.123	1343.729

Circle Center At X = 306.429 ; Y = 1671.226 ; and Radius = 651.060

Factor of Safety
*** 1.445 ***

Failure Surface Specified By 61 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	34.068	1089.649
2	47.546	1083.064
3	61.186	1076.825
4	74.981	1070.935
5	88.922	1065.398
6	102.999	1060.217
7	117.204	1055.397
8	131.526	1050.940
9	145.957	1046.849
10	160.488	1043.127
11	175.109	1039.776
12	189.811	1036.798
13	204.583	1034.196
14	219.417	1031.971
15	234.303	1030.124
16	249.231	1028.656

17	264.192	1027.569
18	279.175	1026.864
19	294.172	1026.540
20	309.172	1026.598
21	324.165	1027.038
22	339.143	1027.859
23	354.094	1029.062
24	369.011	1030.645
25	383.882	1032.607
26	398.698	1034.947
27	413.450	1037.664
28	428.128	1040.755
29	442.723	1044.219
30	457.224	1048.053
31	471.623	1052.256
32	485.911	1056.823
33	500.078	1061.753
34	514.114	1067.042
35	528.012	1072.687
36	541.761	1078.684
37	555.353	1085.029
38	568.779	1091.717
39	582.030	1098.746
40	595.099	1106.109
41	607.975	1113.803
42	620.651	1121.823
43	633.120	1130.162
44	645.371	1138.816
45	657.399	1147.780
46	669.194	1157.046
47	680.750	1166.610
48	692.058	1176.465
49	703.112	1186.605
50	713.904	1197.023
51	724.427	1207.712
52	734.675	1218.666
53	744.641	1229.877
54	754.317	1241.338
55	763.699	1253.042
56	772.780	1264.981
57	781.554	1277.147
58	790.015	1289.533
59	798.159	1302.130
60	805.979	1314.930
61	808.630	1319.529

Circle Center At X = 299.393 ; Y = 1615.622 ; and Radius = 589.105

Factor of Safety

*** 1.447 ***

Failure Surface Specified By 62 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	24.449	1089.978
2	37.616	1082.793
3	50.969	1075.958
4	64.497	1069.478
5	78.191	1063.358
6	92.043	1057.601
7	106.041	1052.213
8	120.177	1047.195
9	134.441	1042.553
10	148.822	1038.289
11	163.311	1034.406
12	177.897	1030.907
13	192.571	1027.795
14	207.321	1025.071
15	222.139	1022.738
16	237.012	1020.796

17	251.932	1019.248
18	266.888	1018.095
19	281.869	1017.337
20	296.864	1016.974
21	311.864	1017.008
22	326.858	1017.438
23	341.835	1018.263
24	356.786	1019.484
25	371.698	1021.099
26	386.563	1023.108
27	401.370	1025.508
28	416.108	1028.298
29	430.768	1031.477
30	445.338	1035.041
31	459.809	1038.989
32	474.171	1043.318
33	488.413	1048.024
34	502.527	1053.105
35	516.501	1058.557
36	530.326	1064.376
37	543.993	1070.558
38	557.492	1077.099
39	570.814	1083.993
40	583.948	1091.237
41	596.887	1098.826
42	609.621	1106.753
43	622.142	1115.014
44	634.439	1123.603
45	646.506	1132.514
46	658.333	1141.740
47	669.912	1151.275
48	681.236	1161.112
49	692.296	1171.245
50	703.085	1181.667
51	713.594	1192.369
52	723.817	1203.346
53	733.747	1214.589
54	743.377	1226.089
55	752.699	1237.841
56	761.708	1249.834
57	770.397	1262.061
58	778.760	1274.513
59	786.792	1287.182
60	794.486	1300.058
61	801.838	1313.133
62	804.300	1317.797

Circle Center At X = 303.076 ; Y = 1584.874 ; and Radius = 567.940

Factor of Safety
*** 1.450 ***

Failure Surface Specified By 56 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	33.667	1089.663
2	47.351	1083.517
3	61.193	1077.739
4	75.185	1072.333
5	89.316	1067.303
6	103.577	1062.651
7	117.957	1058.383
8	132.446	1054.500
9	147.033	1051.005
10	161.708	1047.901
11	176.461	1045.191
12	191.281	1042.875
13	206.158	1040.956
14	221.081	1039.435
15	236.039	1038.313

16	251.021	1037.591
17	266.018	1037.270
18	281.018	1037.349
19	296.010	1037.828
20	310.984	1038.708
21	325.930	1039.988
22	340.835	1041.667
23	355.691	1043.742
24	370.486	1046.214
25	385.210	1049.081
26	399.851	1052.339
27	414.401	1055.988
28	428.848	1060.023
29	443.182	1064.443
30	457.393	1069.245
31	471.470	1074.424
32	485.404	1079.978
33	499.185	1085.901
34	512.803	1092.191
35	526.247	1098.842
36	539.510	1105.850
37	552.580	1113.209
38	565.450	1120.915
39	578.108	1128.962
40	590.548	1137.344
41	602.759	1146.056
42	614.733	1155.090
43	626.461	1164.442
44	637.936	1174.103
45	649.148	1184.067
46	660.090	1194.327
47	670.755	1204.875
48	681.133	1215.705
49	691.219	1226.808
50	701.005	1238.176
51	710.483	1249.802
52	719.648	1261.677
53	728.492	1273.792
54	737.009	1286.140
55	745.194	1298.710
56	749.621	1305.924

Circle Center At X = 270.547 ; Y = 1598.696 ; and Radius = 561.451

Factor of Safety
*** 1.451 ***

Failure Surface Specified By 59 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	39.279	1089.471
2	52.940	1083.276
3	66.754	1077.431
4	80.713	1071.940
5	94.806	1066.805
6	109.026	1062.031
7	123.363	1057.619
8	137.807	1053.574
9	152.350	1049.898
10	166.981	1046.594
11	181.692	1043.662
12	196.473	1041.106
13	211.314	1038.927
14	226.205	1037.125
15	241.137	1035.704
16	256.101	1034.663
17	271.087	1034.002
18	286.084	1033.724
19	301.084	1033.827
20	316.076	1034.311

21	331.051	1035.177
22	345.999	1036.424
23	360.911	1038.051
24	375.776	1040.056
25	390.585	1042.439
26	405.330	1045.198
27	419.999	1048.332
28	434.583	1051.837
29	449.074	1055.713
30	463.461	1059.955
31	477.736	1064.563
32	491.889	1069.532
33	505.911	1074.860
34	519.793	1080.543
35	533.526	1086.577
36	547.100	1092.959
37	560.508	1099.684
38	573.741	1106.748
39	586.790	1114.146
40	599.646	1121.874
41	612.301	1129.926
42	624.747	1138.298
43	636.977	1146.984
44	648.981	1155.979
45	660.753	1165.275
46	672.284	1174.869
47	683.567	1184.752
48	694.596	1194.920
49	705.362	1205.364
50	715.858	1216.079
51	726.079	1227.058
52	736.017	1238.294
53	745.666	1249.778
54	755.020	1261.505
55	764.072	1273.465
56	772.817	1285.652
57	781.250	1298.058
58	789.363	1310.674
59	790.285	1312.190

Circle Center At X = 289.535 ; Y = 1623.212 ; and Radius = 589.498

Factor of Safety
*** 1.453 ***

**** END OF GSTABL7 OUTPUT ****

American Energy Corporation

Pond 14 Stability Analysis Report

STABILITY ANALYSIS

General:

A stability analysis was performed on Sediment Pond No 14 per regulatory requirements. Pond 14 will be utilized for sediment control. The worst case scenario was considered for the analysis which would be the full depth hydrostatic pressure upon the embankment.

A range and variation of parameters were utilized in order to evaluate the proposed slope. Values shown for the soil parameters are based on typical values for similar soils in the area. The resulting parameters utilized, as listed in the attached printout, are, in the opinion of the undersigned, the most reasonable and conservative of the estimated field conditions of the soils. The parameters utilized are somewhat conservative, but still resulted in a Static Factor of Safety of 1.84

A phreatic surface was assumed through the embankment from the permanent pool water surface to the toe of the proposed slope. In addition, the rock surface was conservatively assumed to be located ten feet below the existing ground surface. In actuality, the rock layer is most likely located nearer the existing surface which would result in a higher factor of safety than that indicated in the attached calculations.

Based on the analyses performed by the undersigned and under the assumed conditions, the proposed slope should maintain long term stability and exceed the required regulatory requirements for stability.

TABLE #1
Stability Analysis Soil Parameters

Soil Boundary	Material	Density (pcf)¹	Cohesion (psf)¹	Friction Angle (°)¹
Soil #1	In-Situ	110	500	30
Soil #2	Embankment	106	500	28

(pcf) = pounds per cubic foot
(psf) = pounds per square foot
(°) = degrees

Method of Analysis

The stability analysis was performed using the **GSTABLE 7** computer program. The program is capable of analyzing circular and non-circular failure surfaces. The Modified Bishop Method was used to compute factors of safety. The procedure uses an iterative approach to investigate failure surfaces until a critical surface is found.

Only the circular failure surface was considered since it was found to be more critical.

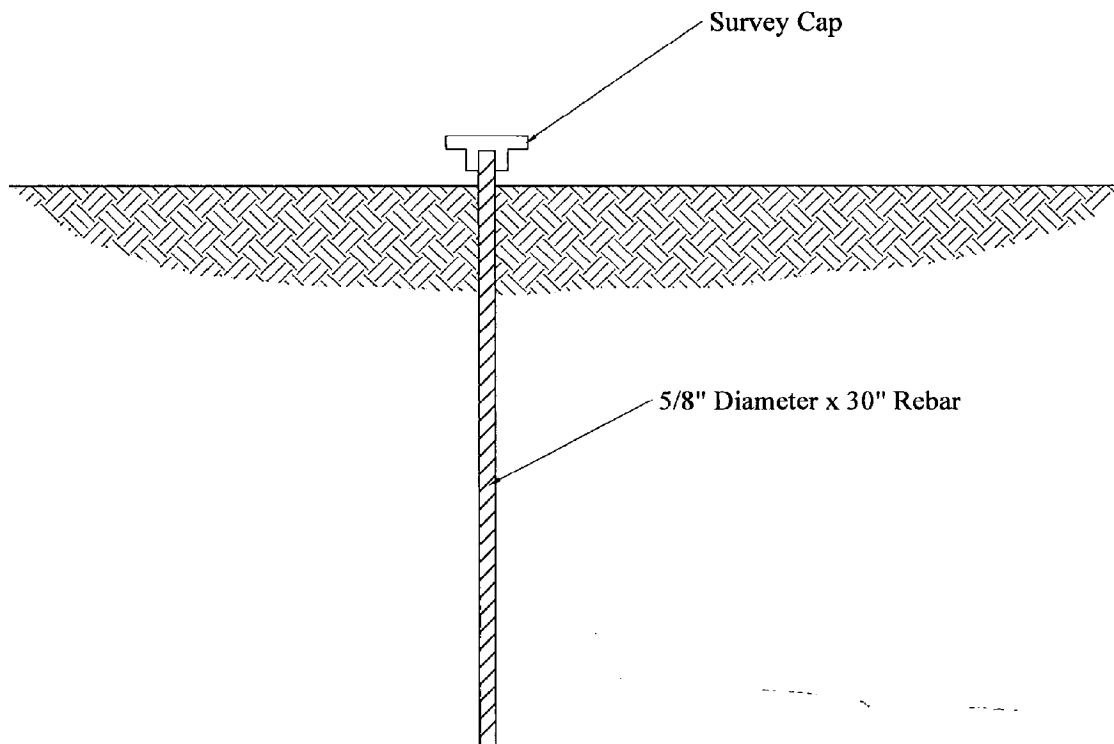
Slope Stability Analysis Results

The output sheets of the **GSTABLE 7** calculations and the stability section used are attached. The static critical failure surface in the analysis had a minimum safety factor of 1.84, which is considered acceptable. Seismic Analysis was also considered in this analysis and resulted in a Factor of Safety equal to 1.51.

Conclusion:

Based on the analyses and the assumed conditions, the proposed embankment slope for Pond 14 should maintain long term stability and exceed the required regulatory requirements for stability.





JUL 30 2010

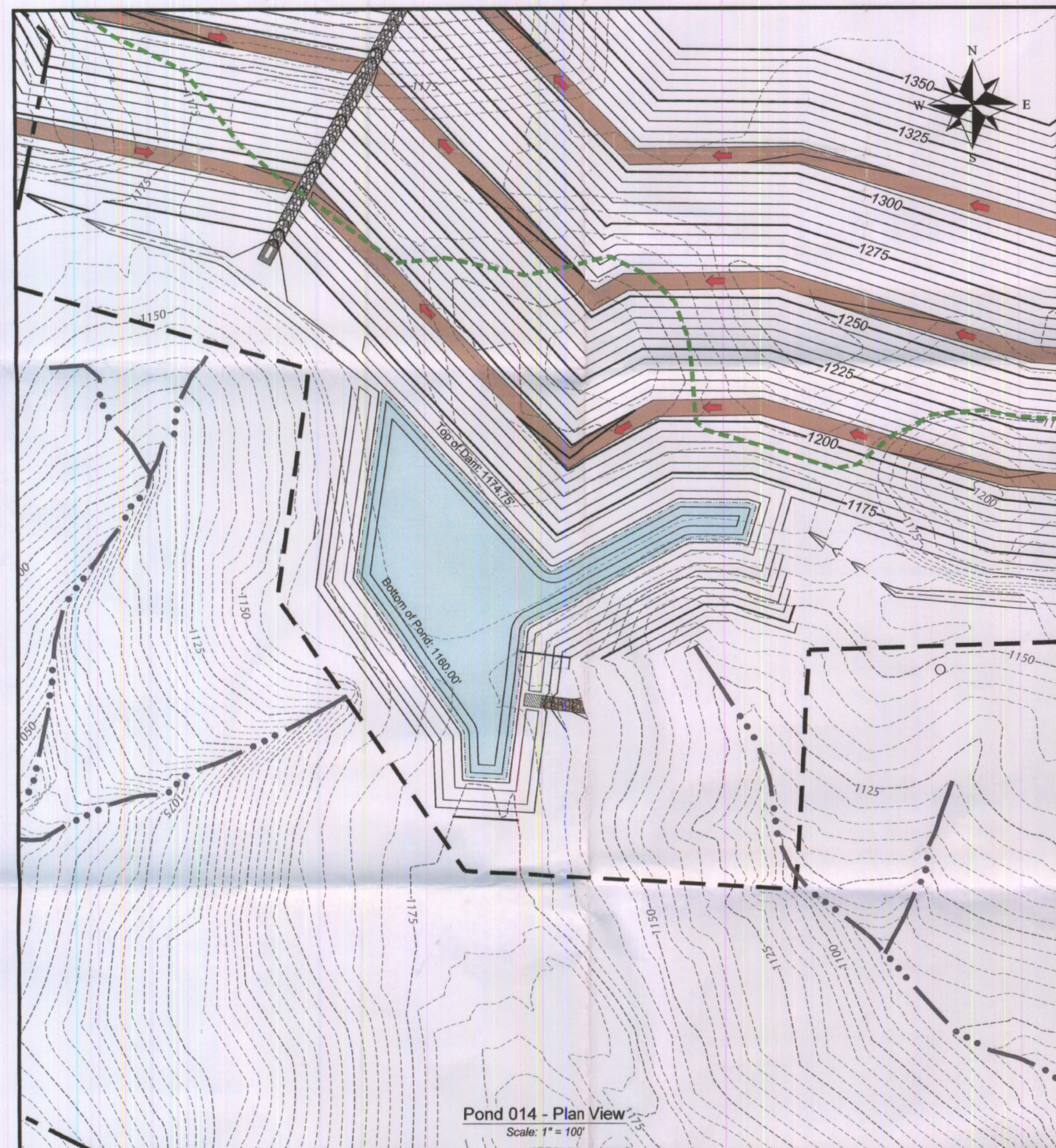
Addendum to Sheet 1 of 5



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American Energy Corporation
 Century Mine Coarse Coal Refuse
 ARP R-0425-21
Survey Monument Detail

AEC 09275

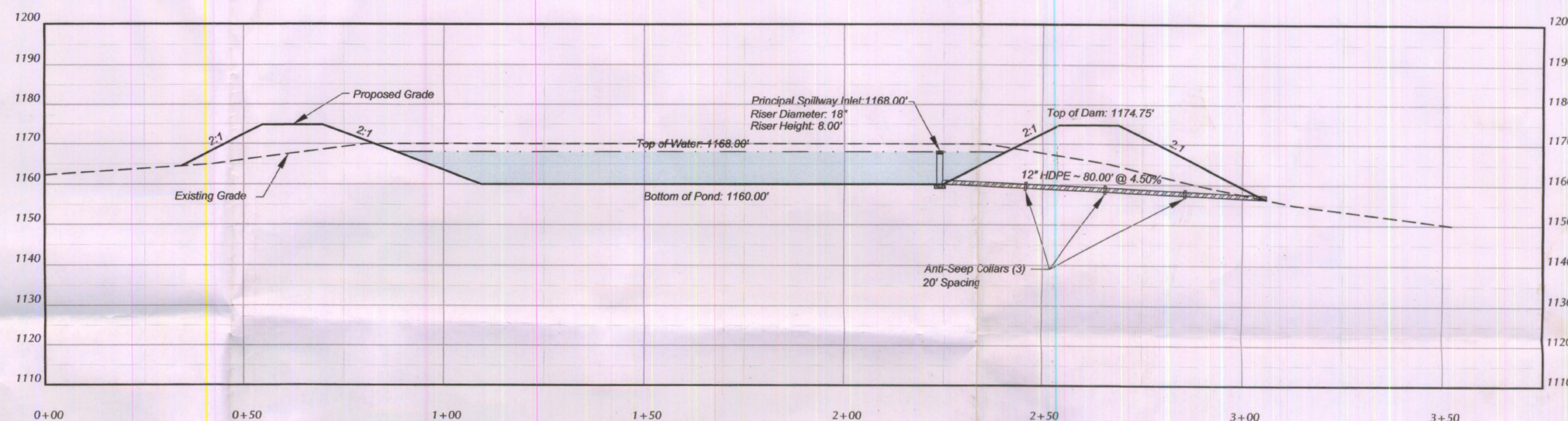


Pond 014 - Plan View
Scale: 1" = 100'

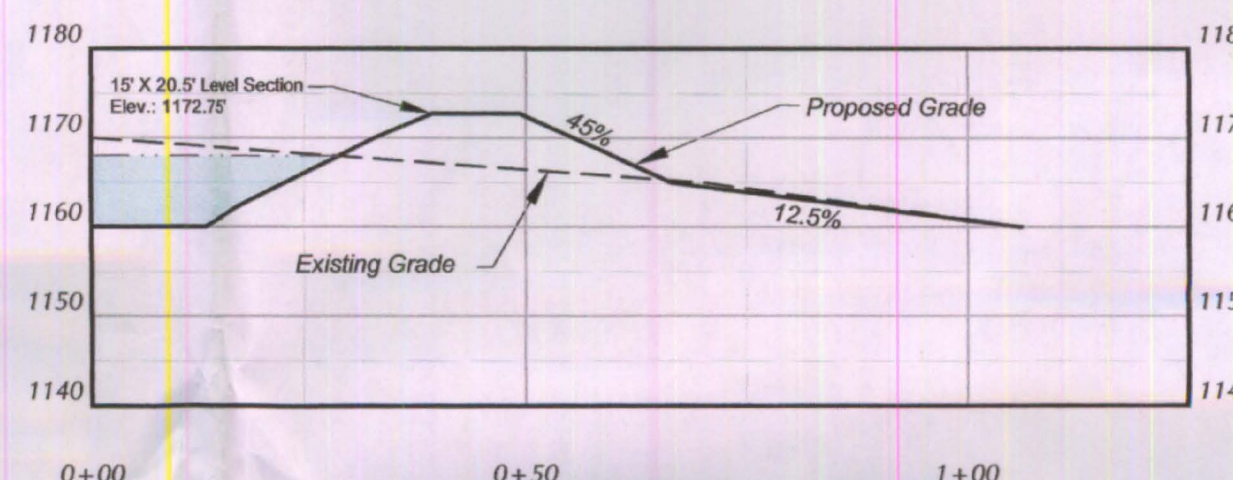
Pond 014 Data

Pond Geometry & Volume

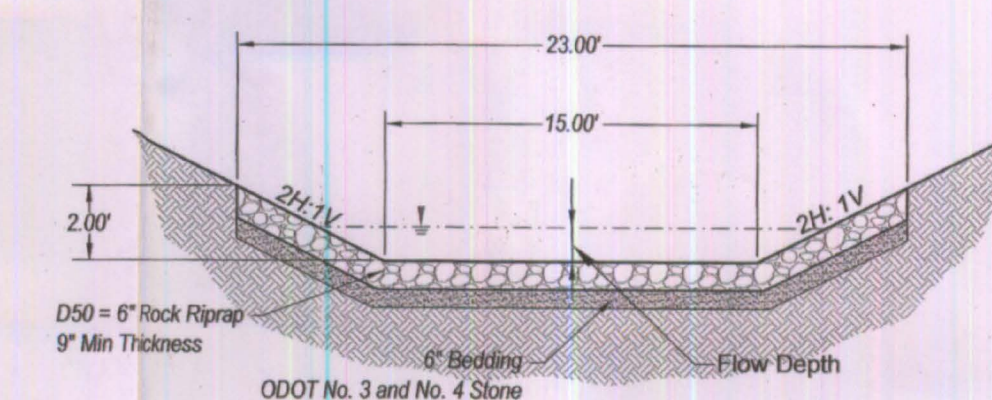
Total Drainage Area	68.01 Acres
Disturbed Area	68.01 Acres (Draining to this structure)
Dam Crest	Elev. 1174.75'
Dam Crest Width	15.00 Ft.
Bottom of Pond	Elev. 1160.00'
Up & Downstream Slopes	2:1 H:1 V
Principal Spillway Type	18" HDPE Riser w/12" HDPE Barrel
Principal Spillway Crest	Elev. 1168.00'
Emergency Spillway Type	Open Channel; 15'-0" W; 15'-0" L Level Section
Emergency Spillway Crest	Elev. 1172.75'
Total Sediment Storage Required	10.26 Ac-Ft
Total Sediment Storage Provided	10.31 Ac-Ft
Peak Stage (10 Yr. 24 Hr. Storm Event)	1172.03'
Peak Stage (25 Yr. 24 Hr. Storm Event)	1172.86'



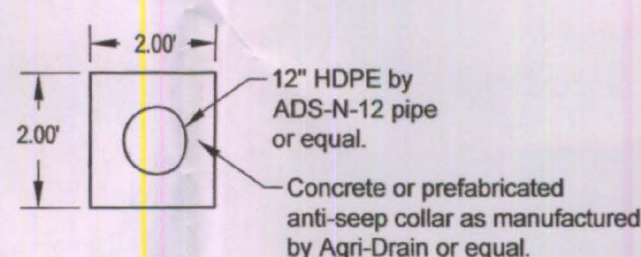
Pond 014 - Profile
Scale: 1" = 20'



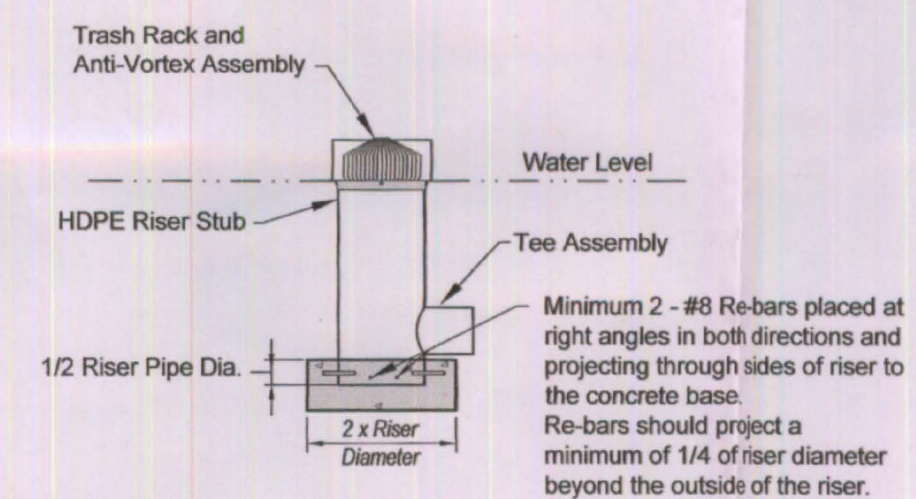
Emergency Spillway - Profile
Scale: 1" = 20'



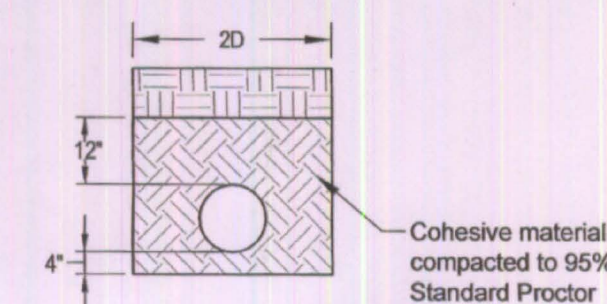
Trapezoidal Rock Lined Exit Channel
Detail
Not To Scale



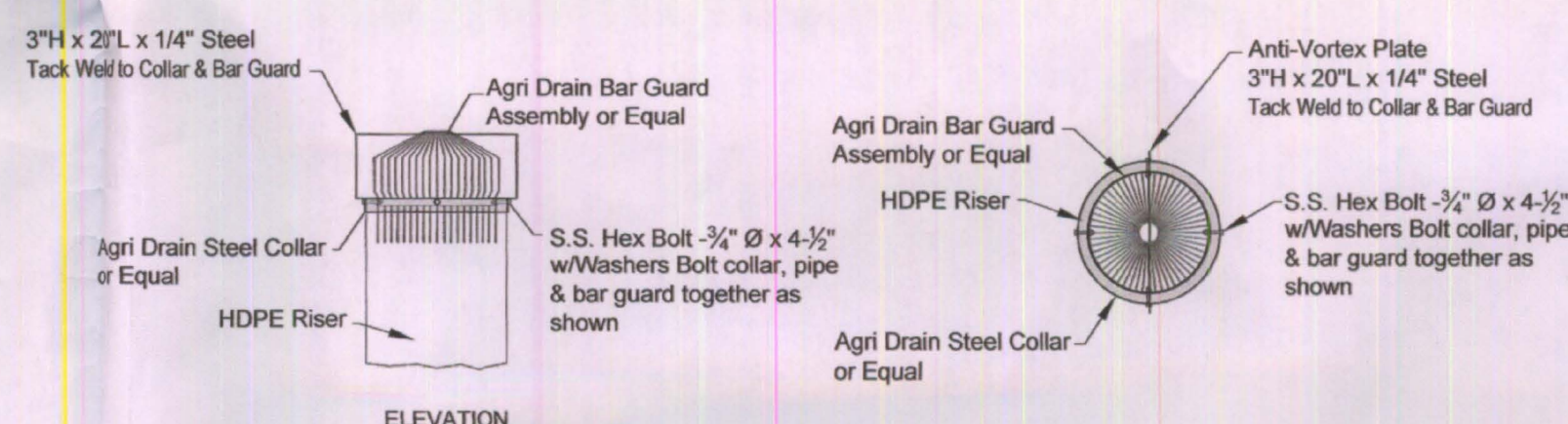
Typical Anti-Seep Collar Detail
Not To Scale



Typical Riser Assembly Detail
Not To Scale

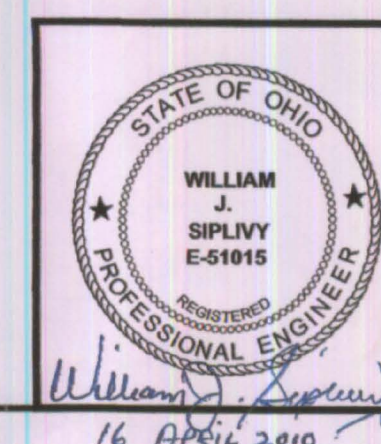


Typical Trench Detail
Not To Scale

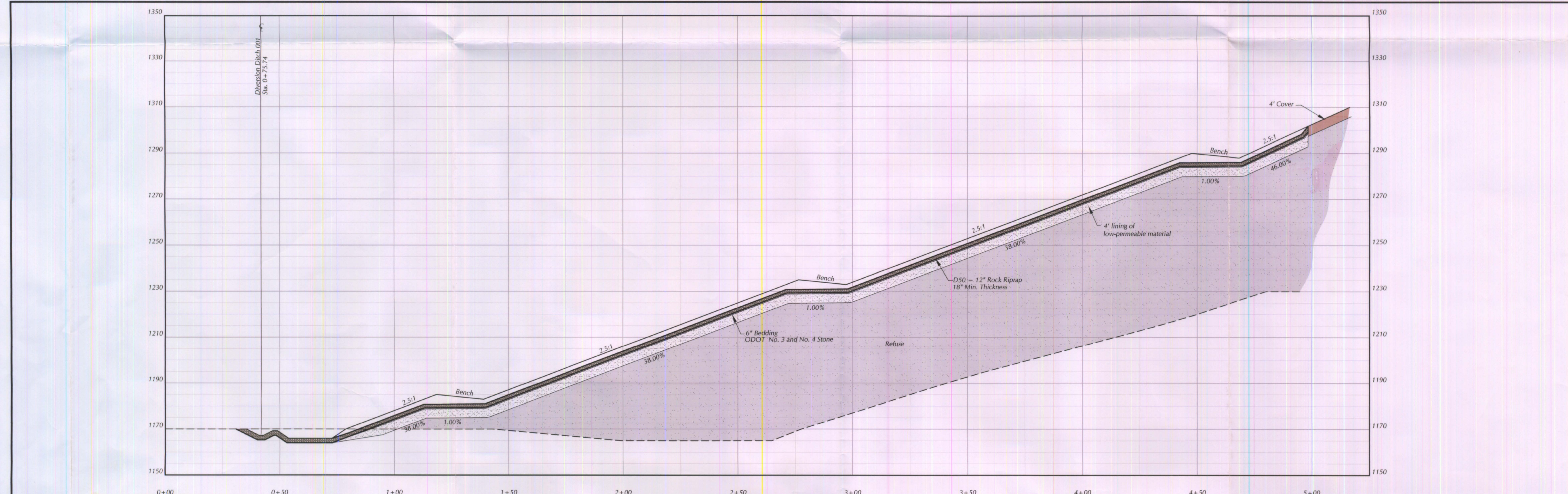


Trash Rack & Anti-Vortex Detail
Not To Scale

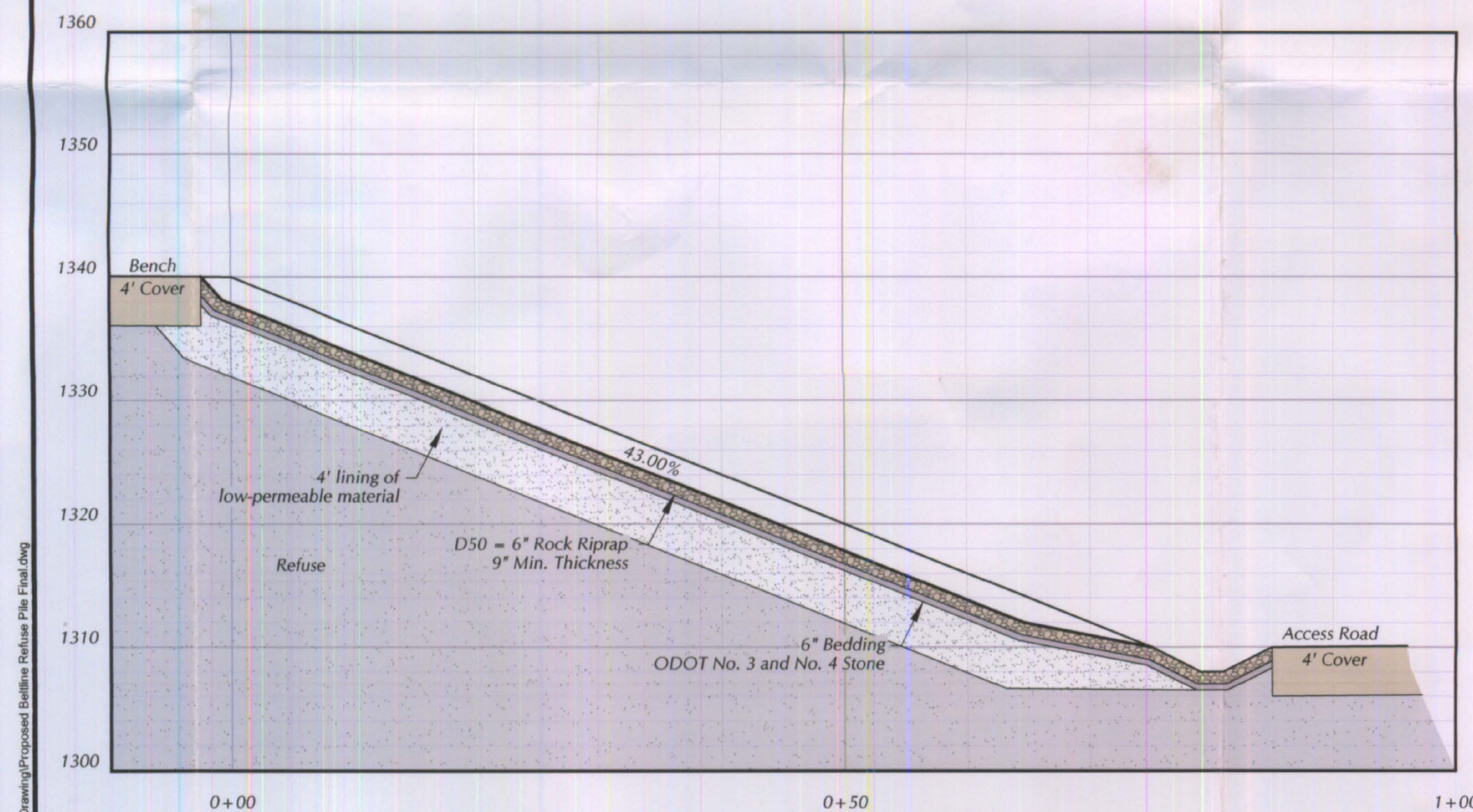
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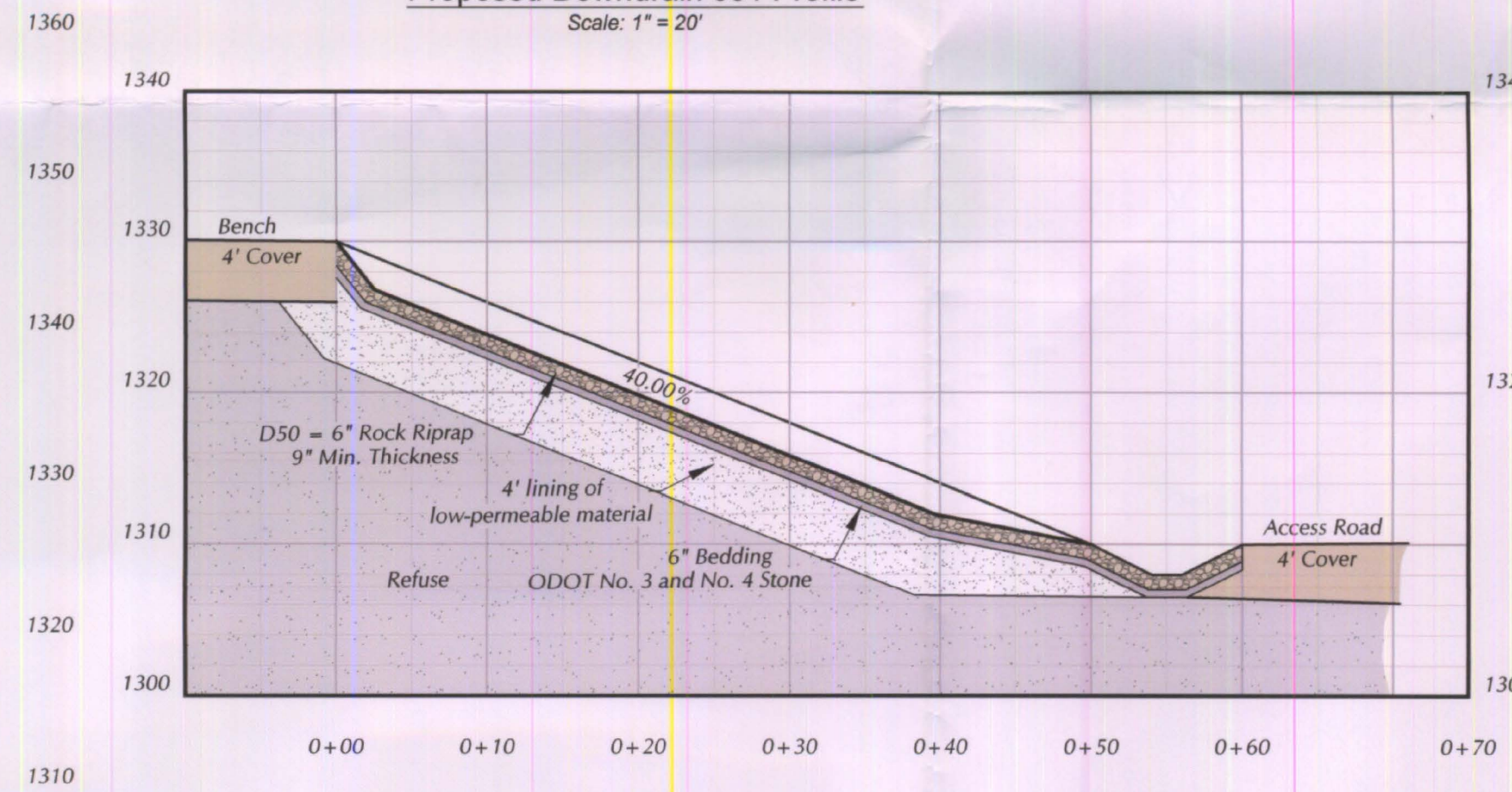
AMERICAN ENERGY CORPORATION		
CENTURY MINE		
43521 MAYHUGH HILL ROAD		
TOWNSHIP HIGHWAY 88		
BEALLSVILLE, OHIO 43718		
POND		
PLANS, PROFILES & DETAILS		
SECTIONS: 3 & 4	T. - 6 R. - 5	TOWNSHIP: WAYNE
COUNTY: BELMONT	SCALE: As Noted	
Drawn by: DJR	Proposed Beltline Refuse Pile, dwp	MINE NO.
Checked by: JWS	Date prepared: October 30, 2008	CENTURY
JACK A. HAMILTON & ASSOC., INC.	Revised: Aug. 17, 2009, April 12, 2010	DRAWING NO.
BOX 471, 342 HIGH STREET	FLUSHING, OHIO 43077	3 of 5



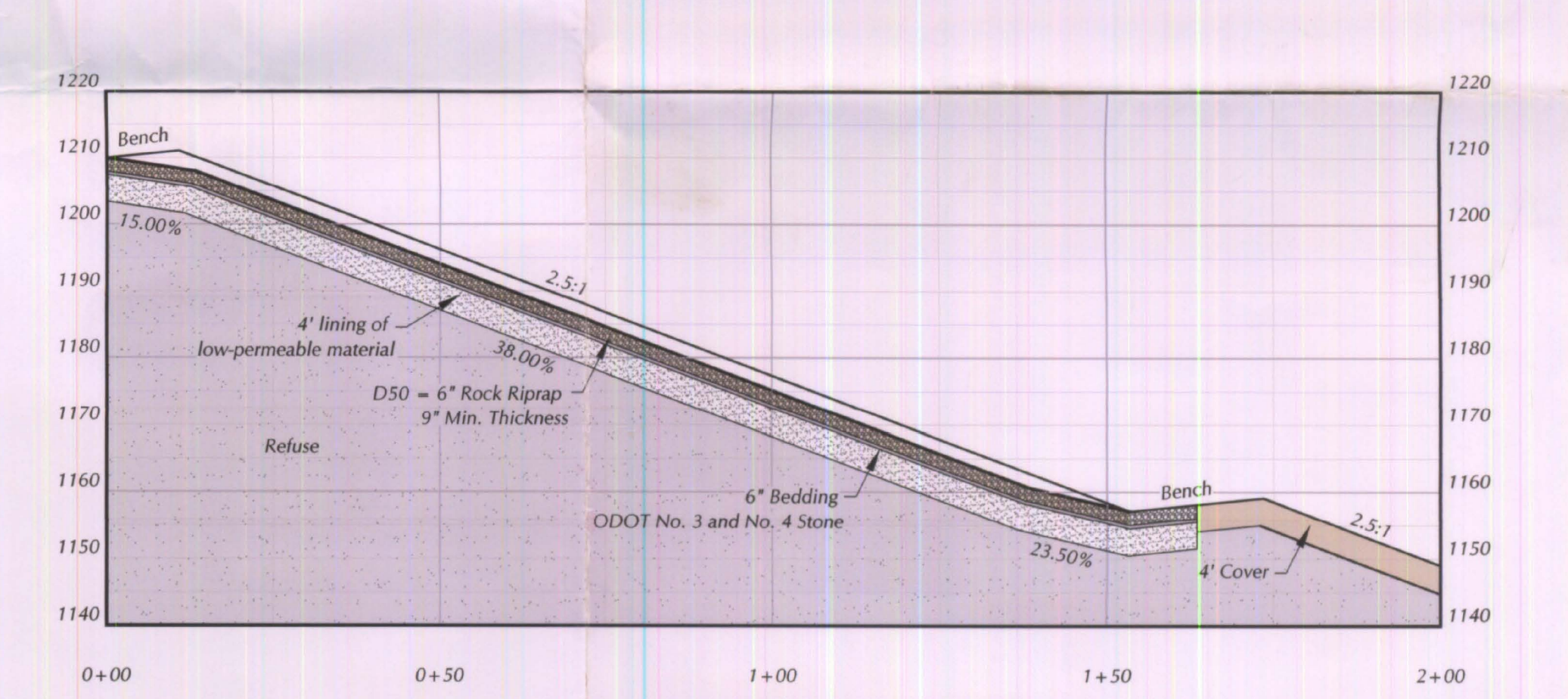
Proposed Downdrain 001 Profile
Scale: 1" = 20'



Proposed Downdrain 002 Profile
Scale: 1" = 20'

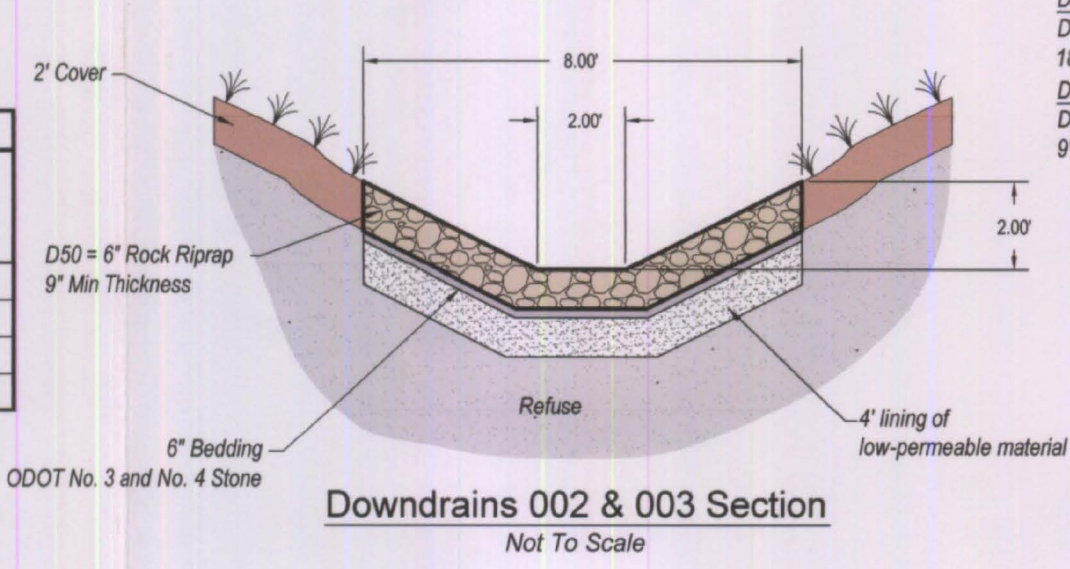


Proposed Downdrain 003 Profile
Scale: 1" = 20'

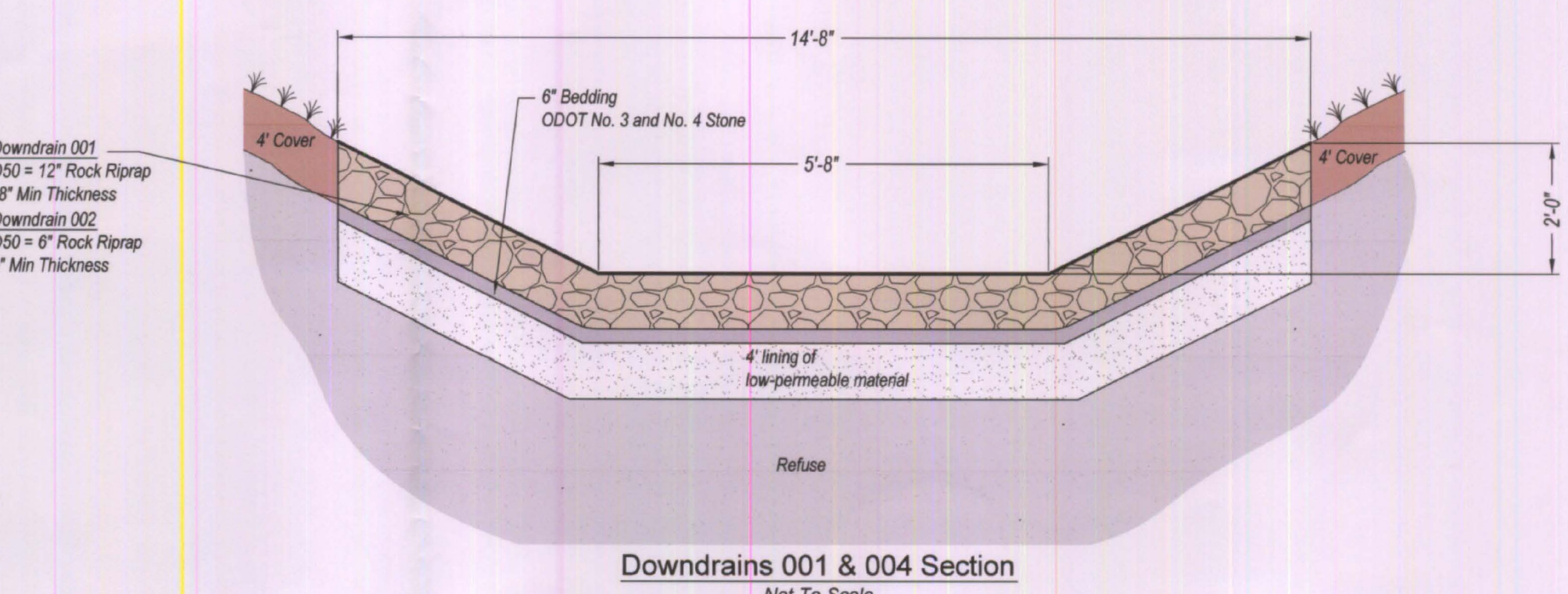


Proposed Downdrain 004 Profile
Scale: 1" = 20'

Proposed Downdrain Information										
Channel	Drainage Area (Acres)	Design Storm	Design Flow (cfs)	Channel Slope	Side Slopes (L/R)	Max. Flow Depth (feet)	Design Depth (feet)	Top Width (feet)	Maximum Velocity (fps)	Channel Lining
Downdrain 1	42.40	100 Yr., 6 Hr.	71.33	38.00%	2:1 2:1	0.87	2.00	9.15	11.04	Rock Riprap
Downdrain 2	3.17	100 Yr., 6 Hr.	7.47	43.00%	2:1 2:1	0.41	2.00	3.63	6.53	Rock Riprap
Downdrain 3	5.00	100 Yr., 6 Hr.	10.35	40.00%	2:1 2:1	0.49	2.00	3.95	7.15	Rock Riprap
Downdrain 4	9.82	100 Yr., 6 Hr.	16.01	38.00%	2:1 2:1	0.38	2.00	7.19	6.56	Rock Riprap



Downdrains 002 & 003 Section
Not To Scale



Downdrains 001 & 004 Section
Not To Scale



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BEALLSVILLE, OHIO 43716

DOWNDRAIN PROFILE & DETAILS

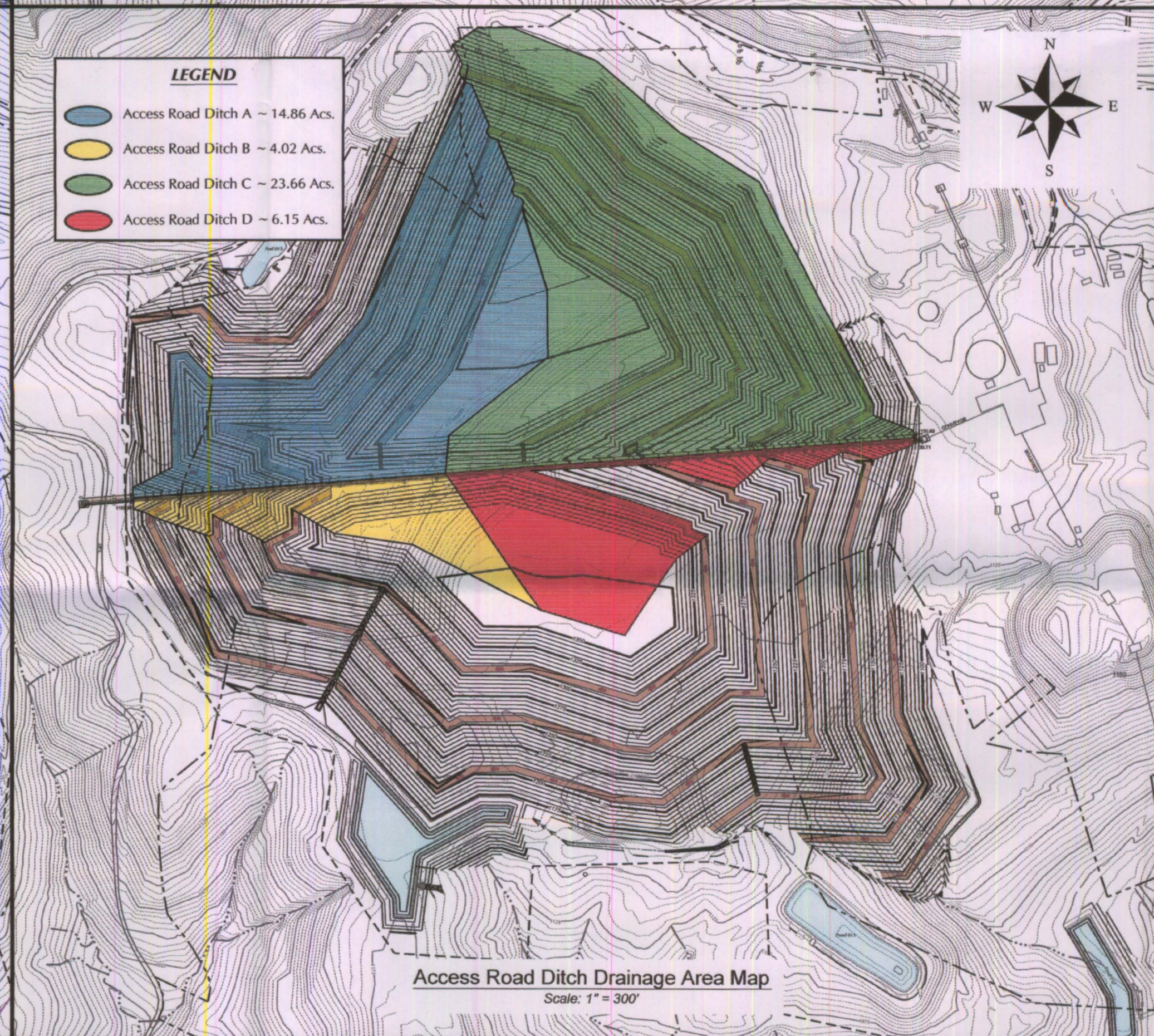
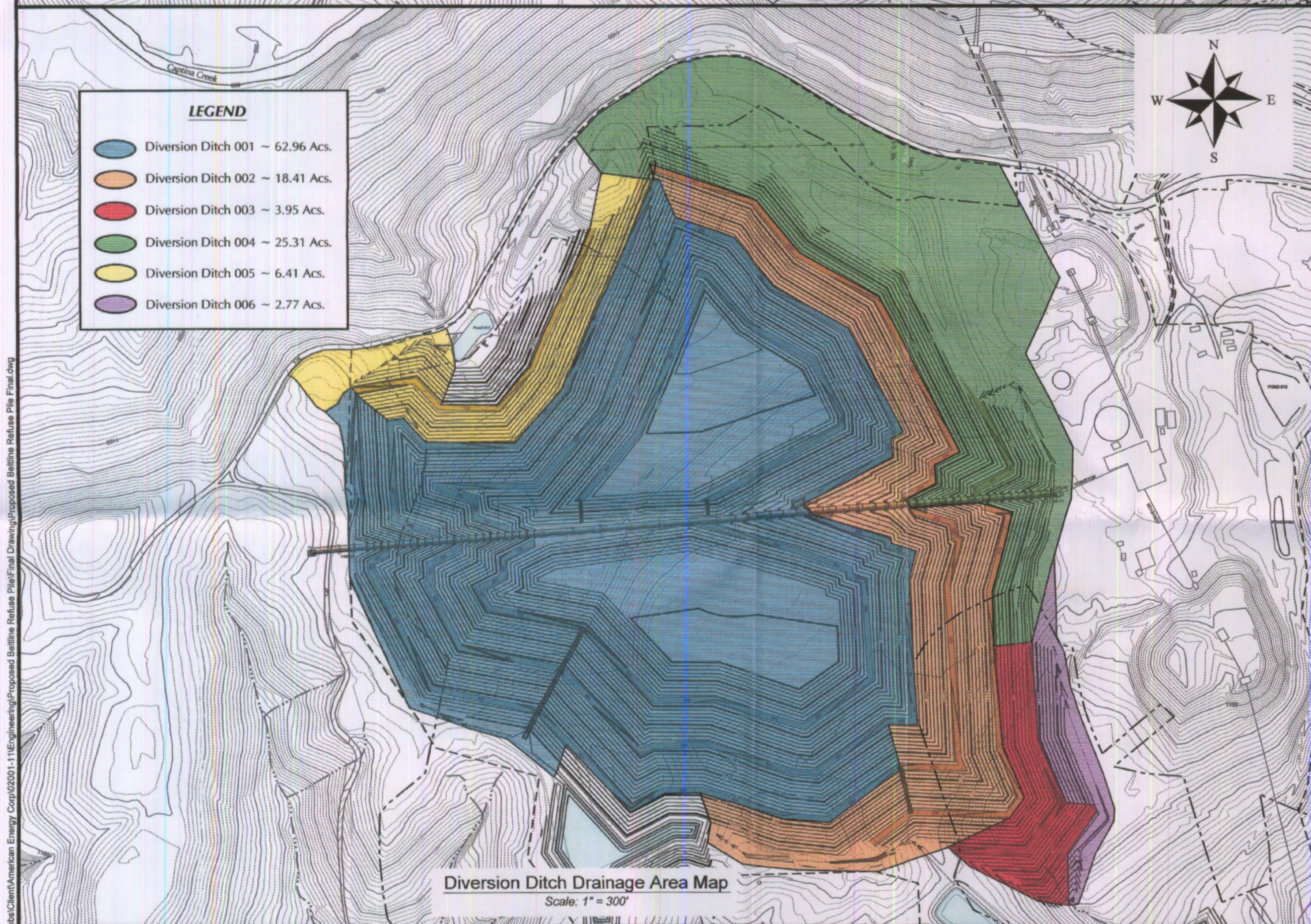
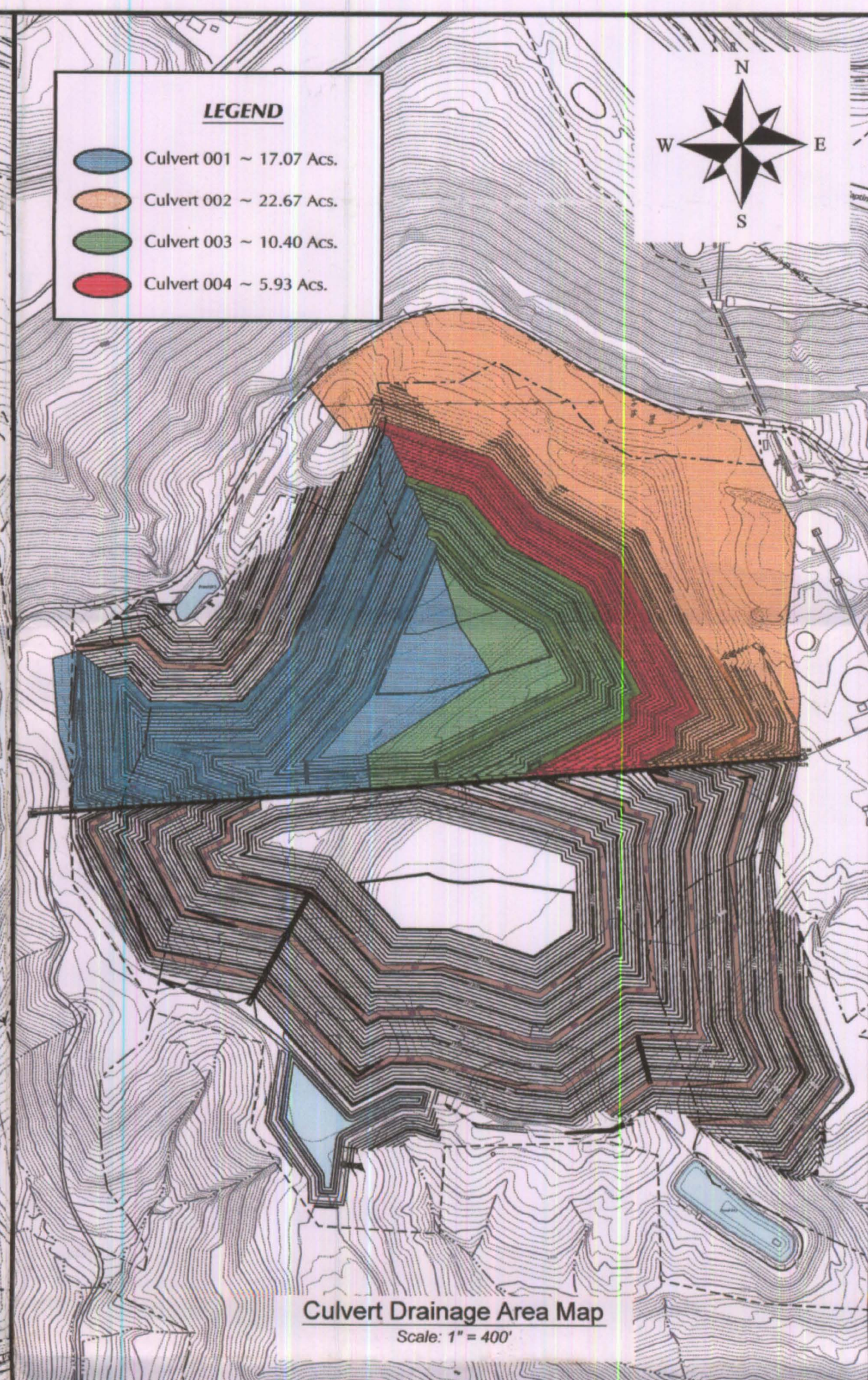
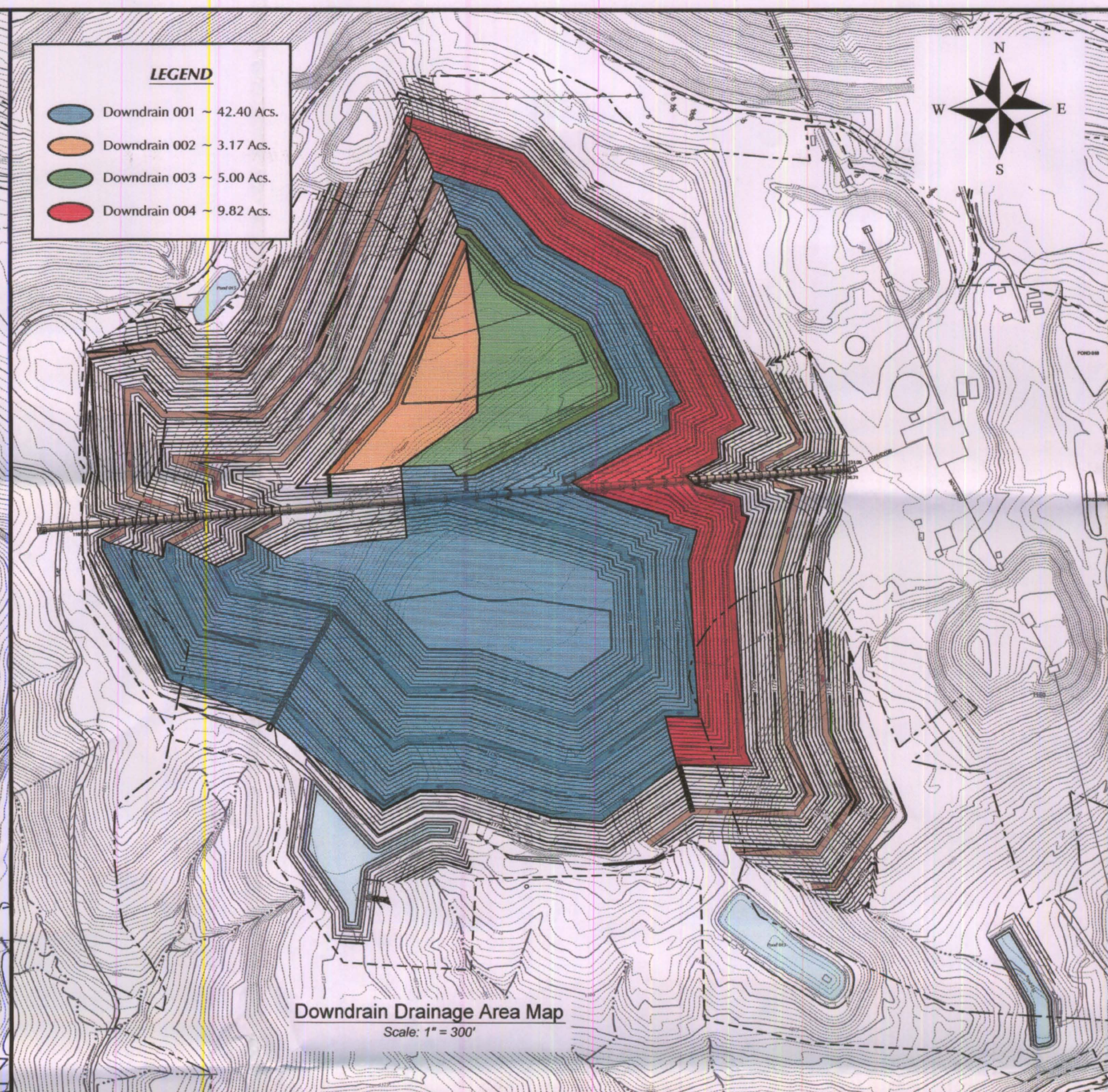
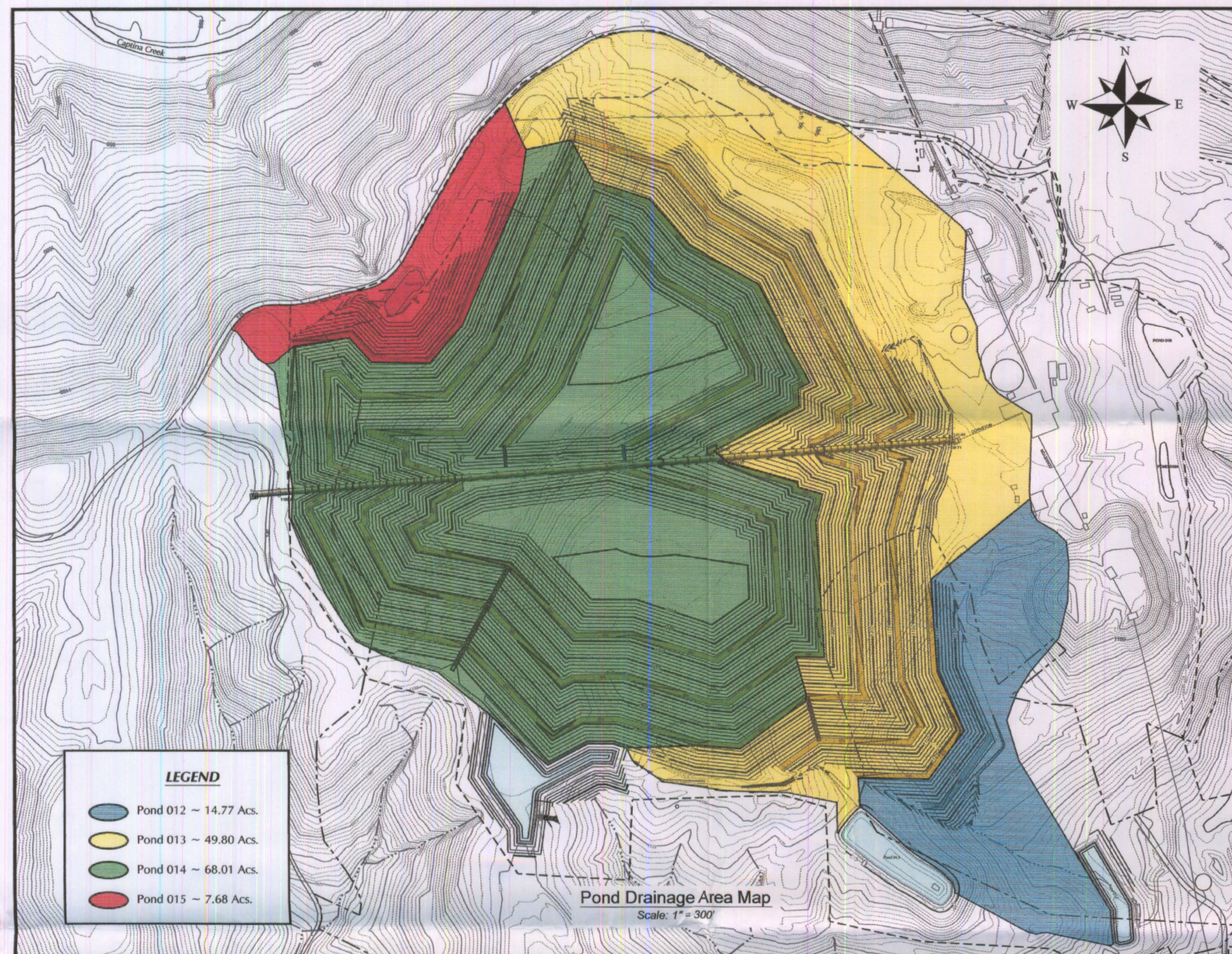
SECTIONS: 3 & 4 T. - 6 R. - 5 TOWNSHIP: WAYNE
COUNTY: BELMONT SCALE: 1"=20'

Drawn by: DJB Proposed Refuse Pile Map
Checked by: WJS Date prepared: October 30, 2008
Revised: Aug. 17, 2009
Revised: July 27, 2010

MINE NO. CENTURY
DRAWING NO. 4 of 5

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DRAINAGE AREA MAPS

SECTIONS: 3 & 4	T. - 6 R. - 5	TOWNSHIP: WAYNE
COUNTY: BELMONT	SCALE: As Noted	
Drawn by: DJB	Proposed Bellline Refuse Pile.dwg	MINE NO.
Checked by: WJS	Date prepared: Aug. 17, 2009	CENTURY
JACK A. HAMILTON & ASSOC., INC.	Revised: April 12, 2010	DRAWING NO.
BOX 471, 342 HIGH STREET FLUSHING, OHIO 43977		5 of 5

STATE OF OHIO
WILLIAM J. SIPLAY
E-61015
PROFESSIONAL ENGINEER

16 APRIL 2010
APRIL

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